COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING

(110–146)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

JUNE 24, 2008

Printed for the use of the
Committee on Transportation and Infrastructure

U.S. GOVERNMENT PRINTING OFFICE

43–277 PDF WASHINGTON : 2008

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

JAMES L. OBERSTAR, Minnesota, *Chairman*

NICK J. RAHALL, II, West Virginia, *Vice Chair*
PETER A. DEFAZIO, Oregon
JERRY F. COSTELLO, Illinois
ELEANOR HOLMES NORTON, District of Columbia
JERROLD NADLER, New York
CORRINE BROWN, Florida
BOB FILNER, California
EDDIE BERNICE JOHNSON, Texas
GENE TAYLOR, Mississippi
ELIJAH E. CUMMINGS, Maryland
ELLEN O. TAUSCHER, California
LEONARD L. BOSWELL, Iowa
TIM HOLDEN, Pennsylvania
BRIAN BAIRD, Washington
RICK LARSEN, Washington
MICHAEL E. CAPUANO, Massachusetts
TIMOTHY H. BISHOP, New York
MICHAEL H. MICHAUD, Maine
BRIAN HIGGINS, New York
RUSS CARNAHAN, Missouri
JOHN T. SALAZAR, Colorado
GRACE F. NAPOLITANO, California
DANIEL LIPINSKI, Illinois
NICK LAMPSON, Texas
ZACHARY T. SPACE, Ohio
MAZIE K. HIRONO, Hawaii
BRUCE L. BRALEY, Iowa
JASON ALTMIRE, Pennsylvania
TIMOTHY J. WALZ, Minnesota
HEATH SHULER, North Carolina
MICHAEL A. ARCURI, New York
HARRY E. MITCHELL, Arizona
CHRISTOPHER P. CARNEY, Pennsylvania
JOHN J. HALL, New York
STEVE KAGEN, Wisconsin
STEVE COHEN, Tennessee
JERRY MCNERNEY, California
LAURA A. RICHARDSON, California
ALBIO SIRES, New Jersey
VACANCY

JOHN L. MICA, Florida
DON YOUNG, Alaska
THOMAS E. PETRI, Wisconsin
HOWARD COBLE, North Carolina
JOHN J. DUNCAN, JR., Tennessee
WAYNE T. GILCHREST, Maryland
VERNON J. EHLERS, Michigan
STEVEN C. LATOURETTE, Ohio
FRANK A. LOBIONDO, New Jersey
JERRY MORAN, Kansas
GARY G. MILLER, California
ROBIN HAYES, North Carolina
HENRY E. BROWN, JR., South Carolina
TIMOTHY V. JOHNSON, Illinois
TODD RUSSELL PLATTS, Pennsylvania
SAM GRAVES, Missouri
BILL SHUSTER, Pennsylvania
JOHN BOOZMAN, Arkansas
SHELLEY MOORE CAPITO, West Virginia
JIM GERLACH, Pennsylvania
MARIO DIAZ-BALART, Florida
CHARLES W. DENT, Pennsylvania
TED POE, Texas
DAVID G. REICHERT, Washington
CONNIE MACK, Florida
JOHN R. 'RANDY' KUHL, JR., New York
LYNN A WESTMORELAND, Georgia
CHARLES W. BOUSTANY, JR., Louisiana
JEAN SCHMIDT, Ohio
CANDICE S. MILLER, Michigan
THELMA D. DRAKE, Virginia
MARY FALLIN, Oklahoma
VERN BUCHANAN, Florida
ROBERT E. LATTA, Ohio

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

EDDIE BERNICE JOHNSON, Texas, *Chairwoman*

GENE TAYLOR, Mississippi
BRIAN BAIRD, Washington
JERRY F. COSTELLO, Illinois
TIMOTHY H. BISHOP, New York
BRIAN HIGGINS, New York
RUSS CARNAHAN, Missouri
JOHN T. SALAZAR, Colorado
MAZIE K. HIRONO, Hawaii
HEATH SHULER, North Carolina
HARRY E. MITCHELL, Arizaon
JOHN J. HALL, New York
STEVE KAGEN, Wisconsin
JERRY MCNERNEY, California, *Vice Chair*
ELEANOR HOLMES NORTON, District of Columbia
BOB FILNER, California
ELLEN O. TAUSCHER, California
MICHAEL E. CAPUANO, Massachusetts
GRACE F. NAPOLITANO, California
MICHAEL A. ARCURI, New York
VACANCY
JAMES L. OBERSTAR, Minnesota
(Ex Officio)

JOHN BOOZMAN, Arkansas
JOHN J. DUNCAN, JR., Tennessee
WAYNE T. GILCHREST, Maryland
VERNON J. EHLERS, Michigan
FRANK A. LOBIONDO, New Jersey
GARY G. MILLER, California
ROBIN HAYES, North Carolina
HENRY E. BROWN, JR., South Carolina
TODD RUSSELL PLATTS, Pennsylvania
BILL SHUSTER, Pennsylvania
CONNIE MACK, Florida
JOHN R. 'RANDY' KUHL, JR., New York
CHARLES W. BOUSTANY, JR., Louisiana
JEAN SCHMIDT, Ohio
CANDICE S. MILLER, Michigan
THELMA D. DRAKE, Virginia
ROBERT E. LATTA, Ohio
JOHN L. MICA, Florida
(Ex Officio)

CONTENTS

U.S. House of Representatives
Committee on Transportation and Infrastructure

James L. Oberstar
Chairman

David Heymsfeld, Chief of Staff
Ward W. McCarraghey, Chief Counsel

Washington, DC 20515

John L. Mica
Ranking Republican Member

James W. Coon II, Republican Chief of Staff

June 23, 2008

SUMMARY OF SUBJECT MATTER:

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on Comprehensive Watershed Management and Planning

PURPOSE OF HEARING

The Subcommittee on Water Resources and Environment is scheduled to meet on Tuesday, June 24, 2008, at 2:00 p.m. in 2167 RHOB, to receive testimony on Comprehensive Watershed Management and Planning efforts. Testimony is expected from Steve Stockton, Army Corps of Engineers; Gerald Galloway, University of Maryland; Larry Larson, Association of State Floodplain Managers; William Mullican, Texas Water Development Board; Carol Collier, Delaware River Basin Commission; Brian Richter, The Nature Conservancy; Paul Freedman, Water Environment Federation.

BACKGROUND

While there have been varying levels of watershed planning over the past century, the focus has primarily been on isolated water resource issues such as water quality, stormwater runoff, flood control, fish and wildlife habitat, and water supply. Historically, this planning has been typically led by a single state/federal agency, or a unit of local government, with little or no outside/public involvement addressing a narrow legal mandate. The resulting plans frequently failed to capture the full needs of watershed resources and have not had public buy-in on the resulting recommendations.

In recent years, watershed planning has faced increased criticism for the limited bureaucratic approach and focus on limited water resources issues. This has resulted in call for greater public involvement and study of a broader array of watershed concerns. In response, watershed planning has begun to evolve beyond the tight focus into a more comprehensive process with greater public engagement.

Most states and federal agencies have watershed programs or support levels of watershed planning. While many of the federal watershed programs have become more open to public participation, all have many of the historic limitations and continue to be limited in focus, addressing agency missions and not looking at comprehensive watershed concerns e.g Army Corps of Engineers primarily focus on flood control, navigation, and ecosystem restoration; EPA programs address water quality concerns related to Clean Water Act concerns; and NRCS programs typically address agricultural non-point source runoff and sediment loss. This hearing will explore the experiences of different experts, reviewing what efforts have been successful, what roles federal agencies play, and factors to include in watershed planning.

There are widely diverse water conditions around the United States and all are managed differently and often independently of other water areas and projects. There are many federal and state agencies with management responsibilities in addition to the very different water laws of the various states. Generally this has resulted in local and narrowly focused project objectives with little consideration of the broader watersheds that surround these projects. In addition, there have been increased demands for water resources, in part due to increased population and an increased recognition of the need to reserve water for aquatic ecosystems, as well as consumptive uses. Watershed planning brings a recognition of the trade offs involved in water resources management and will assist in making the complex management decisions that will be faced in coming years.

What is a Watershed?

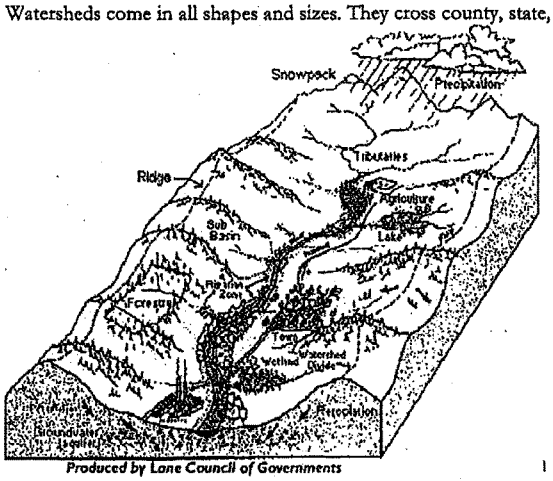
EPA defines a watershed as:

"A watershed refers to a geographic area in which water drains to a common outlet. A watershed includes not only all water resources, such as lakes and rivers, but also the land that drains into these resources. The watershed approach is a strategy for achieving clean water that relies on decentralized decision making and stakeholder involvement to effectively protect and restore aquatic ecosystems."

John Wesley Powell, scientist geographer, put it best when he said that a watershed is:

"that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."

Watersheds come in all shapes and sizes. They cross county, state, and national boundaries.



[1]

What is Watershed Planning?

Watershed-based planning provides the framework to coordinate comprehensive water resources planning in the region. Watershed planning and management includes all of the activities associated with conservation of natural resources including preserving, protecting and restoring the streams, wetlands, forests and other natural resources within a watershed. As part of the process for developing watershed restoration plans, information must be collected about existing water quality, quantity, hydrology, habitat conditions, geology, land use, demographics, economics and other factors. Large amounts of data must be collected and good models are needed. As competition for water increases within watersheds, local and regional planners will need comprehensive data and models to help identify the trade offs involved in water resource management decisions.

The State of Texas recently completed a comprehensive state-wide watershed planning exercise. The Texas experience demonstrates that a comprehensive watershed approach requires a significant, long-term commitment to a resource-intensive process, complete with a wide range of skills and experience. As Texas demonstrates, comprehensive watershed planning is no longer carried out solely by a team of hydrologists. The Texas approach requires a team that includes individuals skilled and trained in not only hydrology, but also in geology, biology, socio-economics, engineering, public policy, agriculture, and energy. Additionally, Texas' study sought to understand how rivers and lakes interact with underlying aquifers.

Another critical element of the Texas experience was the need and use of extensive data. Data is the foundation on which all steps in any planning process rests. Texas invested approximately $36 million in the regional water planning process and another $20 million to collect and analyze basic surface and groundwater data. These data allow Texas to calculate current water

[1] From EPA website http://www.epa.gov/owow/watershed/whatis.html

supplies and make projections for the availability of future supplies to meet needs over the next 50 years.

The Corps and EPA each now try to apply a more comprehensive watershed approach but continue to focus on narrower water resource/quality issues.

For EPA, "A Watershed Approach[2]:

- Is hydrologically defined
  - geographically focused
  - includes all stressors (air and water)
- Involves all stakeholders
  - includes public (federal, state, local) and private sector
  - is community based
  - includes a coordinating framework
- Strategically addresses priority water resource goals (e.g. water quality, habitat)
  - integrates multiple programs (regulatory and voluntary)
  - based on sound science
  - aided by strategic watershed plans
  - uses adaptive management"

As the Corps of Engineers now applies watershed planning, "the Watershed Approach is based on:

1. Seeking sustainable water resources management,
2. Integrating water and related land management,
3. Considering future water demands,
4. Coordinating planning and management,
5. Promoting cooperation among government agencies at all levels,
6. Encouraging public participation,
7. Evaluating monetary and non-monetary trade-offs,
8. Establishing interdisciplinary teams, and
9. Applying adaptive management as changing conditions or objectives warrant."

Why Watershed Planning:

Because of the increasing competition for water, a watershed approach is the most effective framework to address today's water resource challenges. Watersheds supply drinking water, provide recreation and respite, and sustain life. More than $450 billion in food and fiber, manufactured goods, and tourism depends on clean water and healthy watersheds.

The watershed approach can result in cost savings by leveraging and building upon the financial resources and the willingness of the people with interests in the watershed to take action. Through improved communication and coordination the watershed approach can reduce costly duplication of efforts and conflicting actions. Regarding actions that require permits, specific actions taken within a watershed context (for example the establishment of pollutant trading schemes or wetlands mitigation banks and related streamlined permit review) enhances predictability that future

[2] From EPA Website at http://www.epa.gov/owow/watershed/approach.html

actions will be permitted and reduces costs for the private sector. As a result, the watershed approach can help enhance local and regional economic viability in ways that meet local water resource development needs, are environmentally sound, and consistent with watershed objectives.

A comprehensive watershed management plan can help avoid regional conflicts by identifying early the impacts of potential water resources development decisions. Developing such plans is data intensive and involves complex models. Once in place, a watershed management plan can be used to evaluate local water resource development impacts and identify alternatives.

COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING

Tuesday, June 24, 2008

HOUSE OF REPRESENTATIVES,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
Washington, DC.

The Subcommittee met, pursuant to call, at 2:10 p.m., in Room 2167, Rayburn House Office Building, Hon. Eddie Bernice Johnson [Chairwoman of the Subcommittee] presiding.

Ms. JOHNSON. The Committee will come to order.

I need to announce that I am going to have to leave early to go to a classified briefing. And Mr. Carnahan will be taking the chair as I depart.

The United States is a country of very diverse water resource needs. Watershed planning and management provides a means for Federal and local governments to identify water resources conflicts and find potential solutions. In fact, comprehensive watershed management and planning has been raised in several contexts before this Committee over the past year.

At present, several regions of the country face significant water resource challenges, ranging from droughts in the Southeast and Southwest to the recent flooding in the Midwest. Watershed planning and management can be an important tool to help make better decisions in resolving these water resource needs.

Last year, during a hearing on H.R. 135, the Committee received testimony from experts that highlighted the need for a comprehensive watershed approach to water resource planning, one that is not limited just to water supply needs but takes a comprehensive view of all the water resources activities in a watershed, including local, State and Federal roles and activities in water supply, flood control and environmental restoration.

The experts also advise taking into account the impacts of global climate change on water resource capacity and future needs.

WRDA passed last year for the first time in 7 years and included provisions to reinvigorate broader watershed planning authority, including a federally funded assessment of water resource needs for the river basins and watersheds of the southeastern United States and a region-wide study to review drought conditions in the southwestern United States.

These region-wide assessments are essentially critical to southeastern U.S., including the States of Georgia, Alabama and Florida, which are experiencing the ever-increasing challenge of balancing water needs during a record drought.

My home State of Texas has had long experience in water resource planning. Following the drought of the 1950s—I am not old enough to remember that—Texas began its initial efforts in Statewide planning. In 1957, the Texas legislature created the Texas Water Development Board. The board has prepared and adopted eight water plans. Early efforts focused mostly on describing the State's water resources and then evolved into a focus on developing plans addressing water supply, conservation and environmental issues.

We do have a representative here today. I am very proud of my State for the planning.

The drought of 1997 was a watershed event for Texas. This devastating drought caused nearly $5 billion in losses for agriculture and related industries and caused widespread loss and anxiety over water supply shortages. As a result of this statewide event, Texas totally changed its approach to water planning and moved from a very centralized approach to a decentralized process that put primary responsibility for water planning at the regional and local government levels. The new process greatly increased public participation and implemented a bottom-up local and regional planning process. This new effort emphasized conservation and increases in environmental protection.

Texas recently released its 2007 water plan, which is one of the most comprehensive State water plans produced. I am very pleased that we have Mr. William Mullican, deputy executive administrator for planning of the Texas Water Development Board, here today to tell us more about the implementation of this latest plan.

I also look forward to hearing suggestions on how to better develop watershed planning activities from our panel of experts today.

I now yield to our Ranking Member, Mr. Boozman of Arkansas.

Mr. BOOZMAN. Thank you very much, Madam Chairman.

Water resources development planning in the Nation typically has been narrowly focused, usually addressing a single purpose and within a single community. It is not surprising that project planning has developed in this way. When one learns the purposes of a project and geographic scope, solutions become easier to identify.

Also, when it is one community that is sharing in the cost of a water resources development feasibility study, it is reasonable to expect that the focus will be on the concerns of that community.

Impacts on other water uses in the watershed are not necessarily ignored, but they are secondary to the stated purpose of the ongoing study, be it flood control, environmental restoration, water supply or some other use.

Competition for water is increasing throughout the country. More and more often, we are seeing where growing cities' need for municipal and industrial water supplies are at odds with similar needs for that same water downstream. This conflicts with environmental, recreation, navigation or flood control needs elsewhere in the watershed.

What has been missing in most cases is a comprehensive watershed plan against which more focused, local feasibility plans can be measured. Such a comprehensive plan would identify the water supply and demand in the watershed for all its purposes and in-

clude models that would allow planners to see how certain decisions in one area would impact water uses elsewhere. Such an approach would allow local planners to face the inevitable tradeoffs that occur when multiple users with different interests compete for a limited resource.

Facing these issues will be difficult, but they must be done at the State and local level. It is important that we face the fact there is a limited amount of usable water in any watershed. At the State and local levels, water must be conserved, and a plan must be developed on how this limited resource is going to be shared. If we do not do this, we can expect to see many more water conflicts developing around the country.

Citizens in Georgia, Alabama and Florida are currently struggling to find a way to share the water in a watershed that is oversubscribed for water use, at least in drought conditions. This has proved to be a very challenging task for which there are no easy solutions. We must encourage, throughout the Nation, a pattern of comprehensive watershed management that will reduce these kinds of conflicts in the future.

A broad watershed management plan could be a standard upon which traditional feasibility studies for individual projects are measured. Congress could even consider making studies and projects that are consistent with the watershed management plan a priority for appropriations and authorizations.

Exactly how we can make watershed management planning happen is a challenge. What are the appropriate State and Federal roles of such planning? Who should bear the cost? I tend to believe that a State-driven planning effort with heavy local involvement will lead to the best plans with the most acceptance. Certainly, the Federal Government can help with technical assistance and some minimal standards.

Fortunately, we have some expert witnesses today who have been looking at this issue for a very long time and who have some experience with it. I look forward to hearing their insights as to how we can move forward with comprehensive watershed management planning.

And I yield back, Madam Chairman.

Ms. JOHNSON. Thank you, Mr. Boozman.

The Chair now recognizes Mr. Bishop.

Mr. BISHOP. Thank you, Madam Chairman. I want to thank you for holding this hearing on watershed management and planning.

My district encompasses 300 miles of eastern Long Island's coastline and coastal watersheds that I am very proud to represent. Maintaining coastal health is an important objective not only in my district, but also as we seek to preserve our Nation's environment and to sustain the economies of our States that rely on safe, clean water.

Specific to this hearing, I am interested in hearing the panelists' views about the sometimes conflicting responsibilities and jurisdictions between the Army Corps and other Federal and State agencies.

In my district, the Fire Island to Montauk Point Reformulation Study will be concluding next year after decades of work and millions of Federal dollars being spent. As we near completion, the

Army Corps of Engineers, the Department of Interior, through the National Park Service and the U.S. Fish and Wildlife Service, and the State of New York, have begun discussions about the implementations of the study's findings.

These three entities have, to varying degrees, different responsibilities for the implementation of the project, and they also have somewhat differing perspectives on the goals of the FIMP project. While I am confident that the Army Corps, Department of Interior, and New York State will reach a consensus on how to best protect the residents of my district and protect the environment, I am interested in understanding how future projects can be authorized to prevent competing jurisdictions and responsibilities. Increased coordination will save taxpayer dollars and speed the completion of critical projects.

I appreciate the participation of today's panelists, and I look forward to the discussion of these important issues.

Thank you, Madam Chair. And I yield back.

Ms. JOHNSON. Thank you very much, Mr. Bishop.

Mrs. Drake?

Mrs. DRAKE. Thank you, Madam Chair.

First, I would like to thank the Chair for holding today's hearing.

And I would also like to thank the panel members for joining us today, and I look forward to your testimony.

The 2nd District of Virginia is home to the mouth of the Chesapeake Bay, which represents the beginning of a 64,000-square-mile watershed. However, most of us live in a watershed, whether they are large like the Chesapeake or small like a local stream or river.

There are incredibly diverse water conditions across our Nation, from coastlines and bays, such as in the 2nd District, to mountain, plains and desert environments to the west. In addition, there are varying levels of watershed management across the country, which are operated by various entities. These conditions can sometimes lead to regional conflicts over water resources, as well as a lack of understanding of the downstream impacts of developmental decisions.

I look forward to today's hearing to learn more about the opportunities to explore a more comprehensive and collaborative approach to watershed management.

Again, I thank you all for being here today, and I look forward to your testimony.

Thank you, Madam Chair.

Mr. CARNAHAN. [presiding.] I want to recognize the gentlewoman from Hawaii for an opening statement.

Ms. HIRONO. Thank you, Mr. Chairman.

I just wanted to enter for the record the efforts of the partnerships in Hawaii that already pay attention to a very comprehensive method of watershed management and planning. That is because in Hawaii we have a term called ″ahapuaa″ where we think of our land and natural and water resources as running from the mountain to the ocean. And, therefore, a lot of our planning incorporates that perspective. And so we have nine partnerships that includes State, county, nonprofits, businesses and the Federal Government.

And I would like to enter that for the Committee record.

Thank you. I yield back.

Mr. CARNAHAN. Thank you.

I want to turn to our panel of witnesses today that consists of Steven Stockton, Director of Civil Works, U.S. Army Corps of Engineers; Carol Collier, executive director, Delaware River Basin Commission; Larry Larson, executive director, Association of State Floodplain Managers; Brian Richter, co-director, Global Freshwater Team, The Nature Conservancy; Gerald Galloway, professor of engineering, University of Maryland; Paul Freedman, vice president, Water Environment Federation; William Mullican, deputy executive administrator for planning, Texas Water Planning Board.

Your full statements will be placed in the record. We ask that you try to limit your testimony to about 5 minutes as a courtesy to the other witnesses.

And we will proceed in the order the witnesses are listed in the call of the hearing.

Mr. Stockton, please proceed.

TESTIMONY OF STEVEN L. STOCKTON, DIRECTOR OF CIVIL WORKS, U.S. ARMY CORPS OF ENGINEERS; CAROL COLLIER, EXECUTIVE DIRECTOR, DELAWARE RIVER BASIN COMMISSION, WEST TRENTON, NEW JERSEY; LARRY LARSON, EXECUTIVE DIRECTOR, ASSOCIATION OF STATE FLOODPLAIN MANAGERS, MADISON, WISCONSIN; BRIAN RICHTER, DIRECTOR, GLOBAL FRESHWATER INITIATIVE, THE NATURE CONSERVANCY, ARLINGTON, VIRGINIA; GERALD E. GALLOWAY, GLENN L. MARTIN INSTITUTE PROFESSOR OF ENGINEERING, UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND; PAUL L. FREEDMAN, VICE PRESIDENT, WATER ENVIRONMENT FEDERATION, ANN ARBOR, MICHIGAN, WILLIAM F. MULLICAN, III, DEPUTY EXECUTIVE ADMINISTRATOR FOR PLANNING, TEXAS WATER DEVELOPMENT BOARD, AUSTIN, TEXAS

Mr. STOCKTON. Thank you, Mr. Chairman, Members of the Subcommittee. I am Steven Stockton, Director of Civil Works with the U.S. Army Corps of Engineers. Thank you for the opportunity to testify today on the importance of comprehensive watershed management planning on the Corps's role in watershed planning.

Water resources problems we face today are complex. Trends that impact water resources include: the impact of droughts, floods and hurricanes; the migration of people to coastal States; growing urban centers in arid and semi-arid regions, all with a need for reliable, sustainable water supply; urban development in river valleys and its impacts on floodplains; aging infrastructure; and water conflicts between States, which become most apparent when shared water resources diminish, such as under long-term drought conditions. These and other similar challenges require coordinated and collaborative approaches.

Water resource planning and management requires an appreciation of the existing and potential future uses of the water resources and fitting all the pieces and interests into an integrated plan that addresses those very needs.

We are technical experts in water resources management, water policy, regulatory permitting, and disaster response. However, these roles are changing as States and other resource agencies

grow in their engineering and water resource capabilities, with many showing much greater interest in being directly involved and even leading the water resource management opportunities.

Water management is not a sole responsibility of either the State or the Federal Government, but is rather a shared responsibility. Both the Federal Government and the States can benefit from this shared responsibility, and the Corps of Engineers is working to play a constructive role in these partnerships.

Historically, the Corps's flood damage reduction and emergency response efforts have been watershed-based. Since the great Mississippi River flood of 1927, the Corps has been building and maintaining a large system of levees and related features to reduce flood damage in the lower Mississippi River Valley. This and our later effort to reduce flood damage along the Missouri River by building large mainstem dams were based on watershed planning.

For a number of reasons, the civil works construction program has become more focused on specific, locally based projects in recent years. The era of large, multipurpose dams construction has come to a close in this country.

The cost-sharing requirements of the Water Resources Development Act of 1986 may have also contributed to this trend. Our sponsors have limited budgets and are often interested in minimizing their costs to achieve a solution to a specific water resource problem. Watershed studies are more challenging to arrange because they involve multiple sponsors and require compatible interests and aligned budgets.

Nevertheless, we have undertaken a number of watershed studies since the passage of the Water Resources Development Act of 1986. For example, the recent Illinois River Basin Restoration Study covered 30,000 square miles in Illinois, Indiana and Wisconsin. The large geographic scale, numerous stakeholders, close teamwork, innovation and commitment to collaboration earned its selection as the winner of the 2007 Environmental Planning Excellence Award of the American Planning Association.

Our efforts to manage water on a large geographic scale have also led to major Corps aquatic ecosystem restoration programs in the Everglades, in the coastal wetlands ecosystem of Louisiana, and in and along the upper Mississippi River and Illinois waterway.

Nonetheless, the cumulative effect of small-scale decision-making over the past two decades has become more apparent. Now there is a general recognition of the need for more holistic, comprehensive approaches to watershed management at all levels of government.

In 2006, Congress directed the Secretary to initiate a series of pilot watershed studies to address collaboration and planning on a watershed scale at full Federal expense. Funds of $4.5 million were appropriated, and 38 proposals were considered by the Corps. Five studies from across the Nation were selected. We are pleased to report that these 2-year studies nearing completion have benefitted the Nation by bringing resource and stakeholder groups together to solve water resource problems, in many cases for the first time. The unfunded remaining 33 proposals provide an initial indication of the unmet demands for watershed-based analysis.

The main observation from these studies is that collaboration is working, partnerships with the States and other resource agencies have helped to achieve better coordination. The Corps involvement provided tools and databases, collection and sharing of data, engineering, scientific and environmental expertise to assist watershed planning.

How can the Corps assist States? Today we can provide planning and technical assistance through a number of programs, such as authority in Section 729, WRDA 1986, as amended, to support comprehensive watershed planning through a 75 percent Federal and 25 percent local cost-share contribution. We also have planning assistance to States programs.

The Corps role in the water resources community is evolving. In some cases, we are the lead; in others, we are a contributor as a facilitator. This is due to the changing role of the States and local agencies. They are initiating more water resource planning efforts and projects on their own, and are approaching the Corps to assist on a technical level. Partnerships to leverage resources and technical expertise are clearly a requirement to effectively address future watershed studies.

In summary, the need for a comprehensive water resource management and planning for future water resource needs is more important than it has been in the past. Collaborative involvement by the Federal community will be a requirement. As such, the Corps stands ready to work as a partner with State and local leaders by providing technical expertise, working with nongovernmental organizations and other State and Federal agencies, as well as providing science and data to advance locally led collaborative planning.

Mr. Chairman, Members of the Subcommittee, thank you for this opportunity to testify. That concludes my remarks.

Mr. CARNAHAN. Thank you.

Ms. Collier, please proceed.

Ms. COLLIER. Thank you, Mr. Carnahan and Members of the Subcommittee. I am Carol Collier, executive director of the Delaware River Basin Commission.

The DRBC was formed in 1961 and is an interstate Federal compact, the mission of which is to manage water resources without regard to political boundaries. My bosses are five; they are Governors of the four basin States—New York, New Jersey, Pennsylvania and Delaware—and a general in the Corps of Engineers, commander of the North Atlantic Division, who is the appointee of the President. And when he votes, he votes for all Federal agencies.

While it is a small basin, it serves 15 million people. New York City has three huge reservoirs in the very headwaters of the basin and can divert up to 800 million gallons a day out of the basin. It also provides water to Philadelphia and the down-basin estuary area.

This is my favorite topic, so I really appreciate this opportunity. In my short time, I would like to talk about some of the problems and my key recommendations, because integrated water resource management is critical.

One, rivers do not respect political boundaries. To effectively manage rivers, you need to manage on a watershed approach and

also, you know, connect that with our socioeconomic political boundaries.

The river divides two States. It is really hard to manage flood waters just standing on one State and having control of one shore. So you need to look at it holistically.

In our case, one of DRBC's jobs is to keep the saltwater out of Philadelphia intakes, having enough fresh water flowing down the river to push that saltwater back to the bay. The only way that works is having agreements with the upper-basin States—New York, New Jersey, Pennsylvania—to have a release program from the New York City reservoirs, State reservoirs, power reservoirs, so that during drought conditions, plans are already in place and we know what to do.

A second concern is, our existing laws that govern water resources are fractured. It made sense when these were put into place, but now that we know more about the need for holistic watershed management and the problems that the fracturing can cause and missing opportunities, we need to put the pieces back together again.

Thirdly, you have to have a plan. As Mr. Carroll said in ″Alice in Wonderland,″ if you don't know where you are going, you will end up somewhere else. And it is really important, when you are looking at all the different aspects of watershed management, to have a plan, not one of the 5-inch types that you think of from back in the 1970s, but one that is done through an open process, results in priorities, that then we can work with partners, Federal agencies, States, nonprofits and private sector to really implement those priorities.

Another direction that is needed is that no one agency can manage a river basin. It needs to be a collaborative process with all levels of government and key stakeholders. Through the planning process we can make the snowballs—and I do have with me a copy of our resource plan that we put together in 2004 and some summaries of that, if you would like that—but we need partners such as the Corps of Engineers, USGS, et cetera, to really get the actions done.

My key recommendations: One, we need a mechanism to bring principal parties together to manage a river system. In an interstate river basin, I really think river basin commissions are the best mechanism. The commission itself is not above the States and Federal Government; it provides a forum for those principal parties to come together and act on a watershed basis.

Management of natural resources is always changing. You can't draw a line on a rock and say, ″That is what is going to be the allocation for the future.″ Science changes, technology changes, political regimes change, and you need to have a forum for adaptation. And that is what the basin commission provides. This is going to be even more important as we address the concerns of climate change and what that means to our water resources.

Managing water resources is not easy. We don't sing ″Kumbaya″ every day. Everybody has different agendas. But it takes trust, flexibility and a little sacrifice to make it work.

You also can't develop a plan in a crisis, and I think that is what we are seeing down in the Southeast region. You need to have a

plan ahead of time and a river basin commission that not only has planning capability but implementation capability so you can put together a drought operating plan or whatever is necessary.

We need Federal agencies to have more flexibility so they can really work with these watersheds, either at the State level or interstate level. We need to encourage funding of basin planning.

And, finally, a river can be and often is a dividing line, creating a high wall between States, but it can be the rope that binds communities together.

Effective integrated water resource management, using river basin commissions as the local manager and having Federal agencies on a team that really bring their individual expertise, can make our rivers the centers of strong communities and ensure that the water resources are used more cost-effectively and the system is environmentally sustainable.

I will be glad to answer questions and work with you in the future to forward watershed management.

Thank you.

Mr. CARNAHAN. Thank you very much.

Next let's turn to Larry Larson.

Mr. LARSON. Thank you, Mr. Chair. ASFPM is pleased to once again testify in front of this Committee, a Committee that, in our view, has demonstrated a concern for these complex, broad issues and also an in-depth understanding of these issues.

Unfortunately, I have to start with a statement that I have made many times before, and that is, those of us in the Midwest are telling you that once again we are under devastating flooding. That is not news to many of you, of course, but the fact we are seeing these impacts shows many of the things that currently are not working in our plans for watershed management.

On the TV set, I am seeing too many people say this is an event that was unexpected, we couldn't predict it, we didn't know it was going to happen. Well, that tells me that our programs aren't doing a very good job of helping people understand risk, helping people understand the impacts of conflicting watershed management approaches that are leading us toward some of these water quality, water quantity negative impacts, public safety issues, that really should be handled as part of good watershed management.

We shouldn't be seeing things like water treatment plants that are flooded and not operational, critical facilities like hospitals and fire stations that aren't operable during flood events, social disruptions of our communities, businesses out of operation for long periods of time, drinking water contaminated and undrinkable, levee design levels that are inadequate for urban areas and lead to numerous catastrophic flooding failures and overtoppings, closures of roads, streets and bridges. All of those are issues that can be handled through and assisted through good watershed approaches.

We have a number of issues now, but I can assure you that in the next 50 years, as we add 100 million to 150 million people to this Nation, those problems are going to multiply significantly.

I have some detailed recommendations in our written testimony, but let me give you some what I view as pretty much outcomes of what we should work collaboratively together on to get off of this stovepipe problem.

This comprehensive watershed management approach is absolutely essential, that we have all talked about. That is a challenge not only for agencies and programs, but it is a challenge for those of you here in Congress where jurisdictional issues for each of the Committees is still stovepiped, as it is in the programs.

So some forum is probably going to be necessary beyond the formal hearing process, where maybe cross Committees work together, where we have national commissions that you can appoint and come back to you with broad-based recommendations.

Secondly, room for our rivers and oceans. Our deep floodplains and our sensitive ecosystems are areas where we should not build—and those that are there, we need to start a gradual retreat from those high-risk and ecologically sensitive areas.

We need to reverse some of the perverse incentives we currently have, reform those Federal programs that incentivize unwise development in our watersheds. And Federal agency programs that cause adverse impacts on other communities and other properties need to be adjusted so those things don't occur, both on a water quality and a water quantity basis. And we need to restore and enhance those natural systems on our rivers and coasts.

The big issue is renaissance of government, of course, of how we govern water resources management. Both of the previous speakers have talked about that.

Steve has mentioned that the Federal Government role is changing, more to that of a facilitator and technical assistance, less into the actual doing. The bottom-up approach is key and essential. It is a shared responsibility, and it is one that we need to collaborate on and work on.

Most of the solutions to these issues lie in land use, comprehensive planning, community planning. Those are not functions of the Federal Government under our Constitution. They fall under the role of State and local governments. So we must build off of that to really come into our solutions.

Then we have to promote personal and public responsibility. We do have programs that reward those who do things wrong. We need to modify that and change that, so we are rewarding those communities and people who act responsibly and do the right thing, who understand that shared responsibility and accept their cost and risk.

One of the first simple things, for example, is the Corps of Engineers' programs for nonstructural could be cost-shared at a larger cost share, say, 75-25, as opposed to 65-25 for structural. And I think that is a win for the Federal Government, because, in the long term, the Federal Government would not be coming back in, having to build and repair structural measures like we see now—levees that are failed, rebuild the levees, or help for operation and maintenance. So, in the long term, those non-structural kinds of programs should be better cost-shared. That is just one point that I wanted to raise.

With that, I will pass on the rest of it. Thank you.

Mr. CARNAHAN. Thank you.

Mr. Richter?

Mr. RICHTER. Members of the Subcommittee, I want to thank you for this opportunity to testify on comprehensive watershed planning and management.

My name is Brian Richter, and I am the director of The Nature Conservancy's Global Freshwater Team. The Nature Conservancy is a leading conservation organization that protects ecologically important places for both people and nature. Our on-the-ground conservation work is carried out in all 50 States and in more than 30 foreign countries.

The comments that I am going to provide today are drawn from our experience of working on the ground with the Corps of Engineers and other water managers to restore and protect aquatic ecosystems.

The idea of a watershed approach has been around for some time, but it is a term that remains poorly defined and not yet commonly applied. We believe that a watershed approach should be based on natural hydrologic processes that consider water and sediment movement along the river, hydrologic connections between headwaters and downstream areas, including estuaries, and the role of properly functioning floodplains, as some of the previous speakers have emphasized.

This watershed process-based approach should fully incorporate the role of healthy and functioning ecosystems such as wetlands into the project planning and evaluation. By determining how a project or a management activity will affect the downstream systems, considering upstream management actions and land uses in the watershed, a watershed process-based approach can bring valuable insights to the planning and design of water resource projects.

To employ such an approach, the current water resource planning process must be improved. Instead of planning individual projects in isolation, water resource planning efforts should be more frequently seeking to develop and utilize watershed-based tools that allow the Corps and other key stakeholders to make critical decisions about water resources management.

One example of such a tool is a computer-based decision support system being developed by the Army Corps of Engineers and The Nature Conservancy in the Upper Delaware River Watershed. This innovative computer tool will model key physical and biological variables, existing infrastructure, and hydrologic conditions across the watershed. The information will allow State and Federal agencies, as well as key stakeholders, to evaluate the impact and viability of various strategies for reducing flood heights throughout the basin.

Comprehensive watershed management should also include an approach to management of dams and reservoirs that seeks to optimize resource goals throughout watersheds.

The benefits of comprehensive dam management are illustrated through our work on the Penobscot River in Maine, where we are working with a variety of partners to restore hundreds of miles of spawning habitat for endangered Atlantic salmon and numerous other fish species. Under an innovative agreement between the Penobscot River Restoration Trust and the PPL Corporation, three mainstem hydropower dams will be removed in a state-of-the-art fish-passage structure constructed around a fourth dam.

To compensate for the lost energy production due to the removal of the three dams, hydropower production will be increased at other dams in the same watershed. Because the Penobscot project is built on a comprehensive multi-dam evaluation of both hydropower and ecosystem needs across the entire river basin, it will achieve one of the largest river and migratory fish restoration efforts in the eastern United States with little or no hydropower loss.

The Conservancy is also working with the Corps to more comprehensively manage Corps reservoirs through our mutual Sustainable Rivers Project. This innovative partnership seeks to incorporate a broader array of watershed needs, such as downstream ecosystem health, into the operation of Corps dams.

Our work to date has already demonstrated at several sites that modest adjustments to existing dam operations can accommodate a broader set of watershed needs without impacting the original purposes of the dam. In fact, on the Green River in Kentucky, our work with the Corps to restore the river's health by modifying dam operations actually improved the flood control performance of the dam and extended the recreation season on the reservoir.

Comprehensively managing our water resources infrastructure, in combination with downstream floodplain management, is a key component of the work at the Sustainable Rivers Project sites, as well as in some of our international water management efforts.

Presently, a tremendous volume of potential water storage space is left empty behind dams because of the spaces needed to be reserved to capture incoming floods and protect downstream structures and roads.

But on the Yangtze River in China we have developed a proposal that is under serious consideration by the Chinese Government to restore the Yangtze Valley's natural floodplain and thereby reduce dependence on the dams as a sole means of flood management. By using floodplains for flood storage instead of dams, the hydropower production at these dams can be increased, expanding a sustainable energy source for this country.

This example illustrates how a comprehensive approach for managing infrastructure, together with floodplains, can create opportunities for greater efficiency and provides the ability to meet multiple watershed goals, such as flood risk management, hydropower production and ecosystem restoration.

Lastly, while the examples above illustrate the importance of improving our planning techniques and better managing our infrastructure in a watershed context, we must also examine how water resource projects are authorized and funded. A project-by-project authorization and funding process makes comprehensive watershed management very, very challenging. Instead, we should be managing projects on a regional or watershed basis by investing in planning tools and approaches that evaluate watershed-wide processes and needs and in implementing projects consistent with the information and the learning that is generated. Regional or watershed-based authorizations, focused on projects that comprehensively meet watershed goals, would encourage such an approach.

To conclude, the Conservancy believes that comprehensively managing our water resources across watersheds can have enor-

mous benefits, ranging from efficient management of infrastructure to maximizing Federal investments to meet multiple needs.

Thank you for holding this hearing today and providing us with the opportunity to present The Nature Conservancy's views and testimony on this topic. I would be happy to answer any questions you may have.

Mr. CARNAHAN. Thank you.

Now, Mr. Galloway with the University of Maryland.

Mr. GALLOWAY. Thank you, Mr. Chairman, Members of the Committee. It is a distinct privilege for me to participate in this important and timely hearing. I am Gerald Galloway. I am a professor of engineering at the University of Maryland, where I teach and do research in water resources.

I come here today to speak to the need for watershed planning, as we continue the development, maintenance and restoration of our Nation's water resources. These resources cannot be sustainably, efficiently and safely developed if we continue to address problems on a project-by-project basis.

Watershed planning and management have brought great rewards to this country. It is not new. In 1927, the Congress directed the Corps of Engineers to conduct comprehensive river basin studies across the United States. These ″308″ studies provided the basis for much of the work that took place in the 1930s and 1940s, including the TVA and on the Columbia.

TVA is a shining example, as each issue TVA faces, whether it was power production, navigation, flood control, malaria prevention, recreation or the environment, was studied in its broadest context and weighed in relation to the others. It was truly systems planning.

Failing to see the need for watershed planning can have serious consequences. We now recognize that, for nearly 40 years, the Nation invested heavily in hurricane protection for New Orleans through construction of levees and other structures without recognizing that the wetlands of coastal Louisiana's watershed were key elements of a natural structural system that provided storm buffering for New Orleans and protection for oil, gas, shipping and fishing industries that generate revenues for the State and the Nation and sustain critical ecosystems.

If watershed planning makes sense, why is it not being accomplished? Well, the nature of the congressional authorization, appropriation and project-focused process supports the stovepipe approach you have heard several people mention and gives projects a priority over watershed planning.

An example: St. Louis sits at the junction of the Missouri, Mississippi and Illinois rivers, and those living in the area, as we have seen on television day after day, rely on levees for their protection. They campaign for increases in the size of their existing levees. Without a comprehensive plan to guide its action, the Corps is forced to look at each levee project in isolation and cannot judge what the cumulative impact on people and the environment will be from new levees.

In 2004, a Senate Committee resolution authorized a comprehensive watershed study of this critical area, yet no funds have been

provided to date to carry out this important effort, and none are in the budget for 2009. Planning has no priority.

To get watershed/basin level planning off the ground, there must be better collaboration among Federal agencies and the States within the basins. There must be better collaboration among congressional Committees authorizing and funding water programs. Committee reports should require watershed planning as a basis for project approval.

The administration, the Congress and the States must develop an approach for management of activities within the watershed and decide who is going to be in charge. Is one Federal agency going to be the lead systems integrator for Federal activities? Is it top-down, or is it bottoms-up?

Texas is a great example for much of us in their bottoms-up planning. Where does bottoms-up and top-down meet, and how can we make that work?

While the United States has put watershed planning on the back burner, other nations have not. The European Union finds, and I quote, ″The best model for a single system of water management is management by river basin,″ unquote. Initiatives for the Maas, the Schelde or the Rhine river basins, very large basins, have served as positive examples of this approach.

Australia also has a long problem with water, and they have been dealing with this in many parts of its country over the last decades, through watershed, what they call catchment management, to ensure that the waters are used effectively and that decision-makers consider the balance among the multiple uses of this resource.

Like the European nations, Australia has found that the integration that is achieved through catchment management has reduced conflicts over water, improved the efficiency of the use of the resource, and more fully involved the stakeholders, an important factor.

Watershed planning eliminates long-term problems. We have technologies and tools, finally, such as shared-vision planning and the models that Brian Richter has just mentioned, that make this possible.

I would urge the Congress to carefully examine the projects it authorizes to ensure that these projects, as they authorize them, are set within a watershed context, and that the authorization and eventual funding by the Congress of individual projects is not creating watershed problems. Now is certainly the time for you to demand watershed planning and management.

Thank you very much for your attention.

Mr. CARNAHAN. Thank you very much, Dr. Galloway. I especially appreciate your reference to St. Louis.

And let's go on now to Mr. Freedman.

Mr. FREEDMAN. Good afternoon, Mr. Chairman and Members of the Subcommittee. My name is Paul Freedman. I am vice president of the Water Environment Federation and president of Limnotech, an environmental consulting firm I founded over 30 years ago. I have been involved in hundreds of water and watershed management projects coast to coast, and have chaired five national conferences on watershed management.

My written testimony highlights why the watershed management approach is the only logical and effective approach to solve today's large-scale and complex water resource challenges. In my statement, I offered several elements of success, including coordination among Federal programs, large-scale water planning, integrating both land use and water planning, the need for comprehensive data and modeling, and multi-stakeholder involvement.

But as I sat to write my oral presentation and keep it within the 5 minutes, I realized some irony. Twelve years ago this month, I co-chaired one of the earliest and largest watershed conferences to ever occur. WEF organized it jointly with 15 Federal agencies. Well over 1,000 experts participated, and more than 5,000 participated through video conference. Hundreds of papers were delivered, and a lot of excitement was generated, illustrated by this fat proceedings book.

At the time, it was kind of this ″a-ha″ moment, you know. We had made enormous progress since the Clean Water Act of 1972, but further progress toward restoring the physical, chemical and biologic health of our water resources and protecting public health and well-being was stalled. Everyone agreed there: Watershed management was the only answer to take us into the 21st century. It was viewed as the new paradigm.

Yet here we sit, 12 years later, and those 15 Federal agencies, despite good intentions, have largely fallen back into siloed, programmatic approaches, focusing on administrative and legislative mandates and not necessarily maximizing the environmental outcomes to the public welfare. Unfortunately today, the same problems exist that we had in the 1990s, compounded by concerns about water scarcity and climate change.

Yet, in the face of this, we are back focusing on specific programs rather than holistic solutions. We have limited agency cooperation, though very well-intentioned people. And we have many good examples. You have heard many from the panelists here today, but most are kind of isolated and have limited success, because widescale and integrated implementation of the watershed approach seems to be limited by programmatic constraints. The missing piece is a compelling articulation of the goal. Congress needs to articulate the watershed approach as our national policy toward water resources.

I often say that today's problems are dramatically different in scale and in nature than those of the 1970s. One example, the Clean Water Act, was passed when the environmental drivers were point-sourced wastewater pollution. Today the drivers are nonpoint sources, land use, ecosystem restoration, water scarcity, flooding, invasive species, endocrine disruptors, climate change, et cetera. The list goes on. And trying to solve these problems with the 1972 Clean Water Act is like trying to use a 1972 auto repair manual to repair a 2008 electric hybrid; it just doesn't work. So it is with other independent and dated Federal programs that don't reflect the large scale and complexity of the problems we are dealing with today.

So I applaud this Subcommittee for examining how we could undertake comprehensive watershed planning and management. I encourage you to consider bold action to change the course of our

water resource programs. We need to move toward a holistic watershed framework that integrates what are now competing water resource concerns, scrambling for attention of Federal agencies and dollars, that often work in isolation and even, at times, cross purpose.

I thank you very much for this opportunity to speak before your Committee today. And WEF would certainly be happy to work with you on this important challenge.

Thank you, again, for the time.

Mr. CARNAHAN. Thank you very much.

Finally, let's turn to William Mullican with the Texas Water Development Board.

Mr. MULLICAN. Thank you, Mr. Chairman, Members of the Committee. For the record, my name Bill Mullican. I am deputy executive administrator for water science and conservation at the Texas Water Development Board.

I would like to again echo my appreciation for this Subcommittee, for your diligence to focusing on water resource issues, not only for the Nation, but also for many issues that have been of particular importance to the State of Texas.

I would like to, rather than repeat many of my co-panelists' remarks, just simply state that I echo the issues that they have raised with respect to the absolute importance and criticality of moving forward with a comprehensive watershed management and planning approach for the nation.

The value of water, as far as it relates to our economy, our environment and our public health, simply cannot be quantified. We can no longer afford the inefficiencies or the ineffectiveness of project-specific, project-driven, silo-driven, mission-driven watershed planning where we often and almost always fail to realize opportunities that exist within a watershed for other efficiencies of scale.

What I would really like to do today is just focus on a couple of things: what I believe watershed planning for the 21st century really must entail; a bit about the Texas experience and Texas's experience with respect to the Federal activities on watershed planning; and then, finally, a recommendation.

First, our working definition. And this is just my working definition of watershed planning. Comprehensive watershed planning is sort of a sequential process. It seems to me that, most often, while we might do one piece or another piece of this process, we always seem to forget to carry it through to fruition. I believe that we have to evaluate and gain an understanding of the physical, chemical, biological and economic characteristics of our watersheds. I believe we have to integrate those characteristics of the watersheds.

I think we then need to move to the next level, whereas we explore the opportunities and challenges that we face in those watersheds, especially as it relates to changing conditions, whether it be the implementation of a new water supply project, the implementation of an environmental restoration project, or even something so broadly applicable as the climate variability that undoubtedly is going to be affecting our watersheds.

We then have to identify all potentially feasible water management strategies, projects, management objectives, everything that

might be identified in order to facilitate the compilation of an effective watershed plan. And then, through a stakeholder-driven process, we must compile those recommendations into a plan that can then be implemented.

Often, though, this is where, even if in an ideal world this is where we are at the end, the reality of it is, is that if you don't put in place a process to monitor implementation of that plan and also put in place a process that allows to systematically review and revise that plan based on changed conditions, then the reality is that plan will quickly become shelf art and of little value.

As far as the Texas experience is concerned, as Madam Chair was just describing, we have suffered through some very significant droughts. We basically expect drought and are very happy when it rains. And right now we are in the early stages of what appears to be another significant drought.

In the 2007 State water plan, there were a number of findings. For example, we now know that our population projections will increase from 23 million people today to 46 million people by 2060. Our current water supplies are on the order of about 17.9 million acre feet per year. We project that that will decline, due to the mining of aquifers and sedimentation in our reservoirs, down to 14.5 million acre feet per year. We understand, though, that our demands for that water supply will increase from about 18.1 million acre feet today to a little over 21 million acre feet per year by 2060.

The result is, if we do nothing right now today, for the first time in our 50-year history of water planning, we will be in the red by about 3.8 million acre feet in 2010, and that number will increase to almost 9 million acre feet per year by 2060. The bottom line is, this planning process, which is basically a watershed planning process, for water supply has resulted in an understanding in the State of Texas of the crisis that we face if we do not do anything.

But the reality of it is that that watershed planning approach for water supply was just that; it was only water supply planning. While we did try to take into consideration water quality and land use and environmental issues, the reality of it is that the focus on water supply planning did not really do the kind of job that we felt like needed to happen in those other areas.

So, in the last legislative session in 2007, the Texas legislature passed Senate Bill 3, which, in part, contained a new watershed effort to look at environmental flows. In other words, what this will do is it has created a similar stakeholder-led process on a watershed-by-watershed basis where recommendations will be developed for how much water needs to be in our streams and rivers and freshwater inflows into our bays and estuaries in order to maintain a healthy ecosystem. That parallel watershed approach to environmental issues will then be integrated into our water supply planning process so that it will then ultimately become a comprehensive effort.

We are not there. We have a lot of work to do. But what we have realized is that doing nothing is no longer an option. We are very concerned about the impacts of drought. And, in fact, in the last legislative session, the Texas legislature appropriated $750 million just for this 2-year biennium to implement water supply projects so that we will be prepared when the next drought hits.

As far as our involvement with the Federal agencies on watershed planning, I echo the remarks of my co-panelists in that the reality of it is it is a very fragmented approach and it has many inefficiencies built into it that we simply can no longer afford as a Nation or as local sponsors working with the Federal Government.

And our recommendation to you today, which is somewhat more repetitive of my remarks back in November when you were considering H.R. 135, is simply this: We would ask that you convene a national forum such that you can pull together all the Federal agencies, the States, regional authorities and NGOs, and have a discussion about what is the appropriate role for the Federal Government and all the agencies in the watershed planning and management activities to ensure that we can gain the kind of efficiencies and effectiveness that are going to be needed if we are going to meet the demands of our Nation as we move forward in protecting our watersheds.

Thank you. And I will be happy to answer any questions you may have.

Mr. CARNAHAN. Thank you all very much.

I am going to start off with a couple of questions before we go to the other Members.

But let me start with Mr. Mullican and Mr. Richter. I wanted to ask these questions of you.

Texas, as you indicated, has recently completed your State-wide watershed planning exercise. Do you think that kind of exercise—has that been done around the country? Is that something that could be used as a model for other States?

And to Mr. Richter, the computer-based system that was used with the Corps in the Delaware River Basin, is that something that could be useful in other watersheds around the country?

And we will start with Mr. Mullican.

Mr. MULLICAN. Yes, sir. In fact, we have worked, Texas has worked with a number of States in the United States, in fact, I personally have worked with about 14 States, in helping them to understand the Texas model for regional water planning. Many of those States are in various different stages of implementing their own version of the Texas model.

Now, I think it is important to note, just as it is in Texas, with average rainfall of 6 inches in the west and 60 inches in the east, there is no one-size-that-fits-all, and it is on a State-by-State basis. There are pieces of our approach that are obviously, though, transferrable and have, in fact, been transferred. For example, in Pennsylvania, they have a very similar water supply planning process in action right now in Pennsylvania.

I think the most important component of it, though, is the realization that it has to be a stakeholder-led process. In Texas, we defined 11 different interests by law that have to be involved in each one of these regional planning groups. And if you don't have the right interests at the table, then whatever decisions come out of that process are not going to be agreed to by the greater community.

The second thing is, is there is an almost overnight realization that we had when we started down this path of the need for good

data and good science. And as a result of that, the State has invested about $50 million over the last decade in the development of water data, of water science, and bringing together the facilitation that is needed to understand that analysis.

So we have transferred this information to other States. And I know that there are a number of States, from California to Pennsylvania and Georgia, that are looking for, for example, looking at the implementation of something similar to the Texas model.

Mr. CARNAHAN. Thank you.

Mr. Richter?

Mr. RICHTER. Yes, thank you, Mr. Chairman.

I want to start by emphasizing that, although we are quite happy with the particular model that we are developing in the upper Delaware, I want to caution against any conversation about which model is the best one to use for these purposes.

And, in fact, one of the maladies that all of these panelists are sharing with you today is, oftentimes, because of the competition among different models or different impressions about what is the best model—it is ″my model is better than your model″—can be one of the dysfunctions that results in us not being able to move forward with comprehensive watershed planning.

So I think the key issue is really rather that somebody needs to have clear directive and authority for leading the watershed planning process; that there is no clear directive. You have heard from the panelists—Dr. Galloway said whether it comes from the bottom-up or the top-down doesn't really matter. Ms. Collier, from the Delaware River Basin Commission, is a tremendous example, a terrific example of an organization that was provided with clear authority and clear directive and funding capabilities to enable them to do the kind of comprehensive watershed planning that I think we are all seeking here.

So I really want to focus the issue on providing some authority and enabling some leadership, as opposed to technology and the tools. The technology and the tools are very sophisticated, very well-advanced. And that really isn't what is limiting our potential here.

Mr. CARNAHAN. Thank you. And for Mr. Stockton, some have been critical of the watershed planning process for focusing on isolated water resource issues that are lead by single State or Federal agencies without enough outside input. Can you identify for us some steps you think the Corps either has taken or can take to ensure that watershed plan is more comprehensive and has sufficient public input along the way.

Mr. STOCKTON. Thank you, Mr. Chairman. Yes, we have recently issued, actually about 3 years ago, we issued an engineering regulation, called Planning in a Collaborative Environment, trying to really focus more on broadening our scope, broadening the involvement of other folks in that process. We are also currently in the process of revising the Corps of Engineers principals and guidelines for how we formulate and plan projects. And we would like to see the whole comprehensive water resource planning component of that as it goes through the process.

I think one of our limitations that has been addressed here is that we are a project-funded organization. We don't have walking

around money to collaborate unless we get specific funding for doing a watershed study. It is just the way we get our appropriation and funding typically drives our ability to look at a broader range of problems that is within a watershed and to solicit through cost-sharing sponsors necessary to partner with us. I think that is probably the biggest limitation.

Mr. CARNAHAN. Thank you very much. Next I want to turn to Mr. Boozman from Arkansas.

Mr. BOOZMAN. Thank you, Mr. Chairman. Mr. Stockton, what do you see as the advantages and disadvantages of the Corps' existing planning authority found in section 729 of WRDA 1986? So right now we have current legislation in place. What are the pros and cons of the legislation as far as you can see?

Mr. STOCKTON. I think it is a great piece of legislation. It allows us to do comprehensive watershed planning. The difficulties are as you look at larger geographic areas, watersheds, is to solicit the interest of a stakeholder, sponsor, to come up with that 25 percent non-Federal share, to look at that broader range of project issues within the watershed.

So I think that is probably the biggest limitation. It is not so much on the authority side. I think we have all the authorities we need to do comprehensive watershed planning. The hard part is to develop the partnerships and the sponsorship to participate financially.

Mr. BOOZMAN. Mr. Larson, in a similar vein, what you do see as the appropriate division of responsibilities between state, local governments and the Federal Government in carrying out comprehensive watershed planning?

Mr. LARSON. Again, I think all of us would probably talk commonly saying there is a role for every level, but the bottom up approach starting at the watershed level, with the local units of governments, with the States playing a coordinating role and an integrating role, and the Federal Government playing a facilitation and a technical assistance role that Mr. Stockton has talked about, that we have all talked about.

Everyone has that role, but we have gone too many years with this top down approach that needs to be inverted if we are really going to end up with an approach that works.

Again going toward what we have all talked about as saying that any specific plan must fit within the context of a total watershed plan.

Mr. BOOZMAN. Mr. Stockton mentioned that one of the obstacles was the Corps could step in and help with the big approach, but trying to find the political will of the local entities, sometimes communities, counties, the State, sometimes interstates to come up with the 25 percent match. What do you see as the biggest obstacle? Do you see that also as a—

Mr. LARSON. Well, to me it is an obstacle because we have let it become an obstacle. The first thing we need to do is disabuse governors, local community officials and our citizens of the notion that the Federal Government is going to solve this problem, because they are not. There isn't enough money in the Federal Government to solve this problem. There isn't the ability overall, or the authority overall to make it happen. But they believe that the Fed-

eral Government will. And as long as they do that, making it a priority at the local level to put resources into solving these problems isn't going to happen. Our programs right now, our Federal programs don't incentivize those communities and citizens to take the leadership in this activity or the States.

So until we set up a structure through our Federal programs that say to them if you do, those communities and States that do these things and do them right, you are going to get the Federal technical assistance that will help you through the process to get these implemented, it is not going to change. I don't believe it is going to change.

Mr. BOOZMAN. Thank you.

Dr. Galloway, we have heard a lot of discussion on the need for the comprehensive watershed planning obviously, most of it is done at the Federal level done by the Corps. What do you think that the agency or that the Corps ought to be doing with regard to the planning process? In other words, where do you see their function being?

Mr. GALLOWAY. The Corps, certainly in many of the studies, has to be the lead for dealing with watershed or a basin plan. But in other cases, I think the Corps has to be in a position to support others in a basin, for example where water quality is a preeminent issue.

In larger basins, you can take the Missouri Basin, or the Mississippi, if you really want to go large, and you recognize you will need an agency that has work in all of those States, all the States of the Basin, and recognizes the immensity of the operation. But it can't be just the Corps of Engineers, it has to be collaborative among the agencies.

And I really believe that this idea of the Federal agency being the lead integrator of the Federal approach can vary from location to location as to who is in charge and what the States roles can be. So you are very familiar with the challenges of trying to get the States in the Missouri Basin to agree on anything. You do need some sort of Federal leadership in that regard just as Ms. Collier has done in the Delaware Basin. But again, I think it is case by case, where the amount of involvement and the roles can differ.

Mr. BOOZMAN. I agree. In our case with Missouri and then the Oklahoma situation that we have, you bring the EPA and other agencies and the politics of it gets very difficult. So we appreciate you all being here. And I will go ahead and defer to the next round, Mr. Chairman.

Mr. CARNAHAN. Next, I want to yield to the gentleman from New York.

Mr. BISHOP. Thank you, Mr. Chairman. As I indicated in my opening statement, I am interested in the issue of how to resolve or overcome a situation in which different agencies, particularly different Federal agencies approach the solving of a problem from different perspectives. And let me be specific, we have this Fire Island and Montauk Point reformulation study in my district, it is actually a very important study that will govern how we protect 83 miles of shoreline and the associated watershed area. The Army Corps is approaching this issue consistent with the goal of national

economic development. So that is to say that they are focusing on shoreline protection and on storm damage mitigation.

The Department of the Interior is approaching this from the perspective of national ecosystem restoration. So they are focusing on restoration of natural habitat and on maintenance of the natural processes in terms of shoreline protection. And these areas don't have to be mutually exclusive, but there is a very strong propensity for them to be viewed as mutually exclusive.

And so, Mr. Stockton, I am going to ask you to comment on this first, and perhaps Mr. Richter, if you could comment on this. I am very interested in how these differing perspectives can be reconciled. So I would appreciate your comments on that.

Mr. STOCKTON. The rules by which we formulate projects and plan them are based upon Principles and Guidelines from 1983. We are currently in the process of revising those. The current Principles and Guidelines really focus on the National Economic Development plan. Those are kind of rules that drive us. And a lot of that is policy. Actually the existing rules actually do give us flexibility to look at an environmental quality account, social effects, regional economic benefits, but because of the budgetary limitations we, through policy, focus primarily just on the national economic development.

As we are working through our revisions to the Principles and Guidelines, we are hoping to elevate the environmental quality account up to a coequal status, if you will, with the national economic development account. So it will be easier for us to do the tradeoffs, recognizing that all of these projects serve multiple purposes and they don't have to be mutually exclusive. So I think we are looking at our policies, trying to improve those and I think we can work through that. So I think there is hope, but right now the focus is on national economic development.

Mr. BISHOP. Mr. Richter.

Mr. RICHTER. Yes, it may seem like I am oversimplifying, but I think, what we are seeing around the world is when we create the forum for dialogue between different agencies, different stakeholders, different interests to come together and bring their expertise and their information and their different values in a context where they can learn from each other, then some very, very positive things can happen.

The question is what kind of a catalyst do we need to provide in order for that type of forum to emerge? And again, I don't think that there is any one particular governance framework that is going to fit for all these situations, but we do have a lot of good examples across the United States and around the world where that type of forum has emerged because there was somebody who took the leadership to direct that the planning activity take place, and then there was funding support to enable it to happen.

So in Texas they passed Senate bill 1, the State legislature provided funding to enable them to do watershed planning to talk about water supply and allocation and sharing the water in the major river basins across the State.

Again, in the case of Delaware River Basin Commission, again, the same initiative, the same leadership to create that Commission, to create that forum where those different interests and ideas and

values can come together along with the funding source. So if we could find the right chemistry, and in your situation there in New York, there probably are a couple of different governance models to look at, but what is necessary is for somebody to create the context and find the funding to enable it, to catalyze it.

Mr. BISHOP. Thank you very much. Mr. Chairman, I yield back thank you.

Mr. CARNAHAN. Next we will go to Ms. Napolitano.

Mrs. NAPOLITANO. Thank you, Mr. Chairman, and Mr. Stockton and mostly to Mr. Galloway. Mr. Stockton, from what I am hearing is they want a leadership, or least the recommendation is for the Bureau to be the leader, but to have a specific plan. Does your 83 principals and guidelines, the new provisions that you are going to hopefully go and institute it would include being able to carry out a plan that maybe then set up to establish that leadership necessary to be able to carry out what these panelists are talking about. And that would then include not only the leadership, but the funding request to Congress to be able then to carry out those things, and not just leave them in limbo, because some of those entities may not of themselves be able to afford to set them up by themselves.

Mr. STOCKTON. Yes, ma'am. I think we would like to see the watershed approach embedded within our revised Principles and Guidelines. We are currently going through interagency coordination with that now, but it is really one of the key parts that we would like to see in the process and procedures by which we put together plans. We have very strong collaborative working relationships with other Federal agencies, with the States, with local and Federal sponsors. And we really do want to have a collaborative bottoms up approach, where we can perform a facilitative role to provide that leadership, to bring folks together, with the technical tools, the models so they can see what the trade offs are to look at alternative plans. We do see a role for us. But it does require appropriations.

Mrs. NAPOLITANO. You are prepared to implement them into your new plan?

Mr. STOCKTON. If funds are appropriated, yes, we would include them in our planning process.

Mrs. NAPOLITANO. In setting forth the roles, the modeling that you would say, would you use those that have been successful? And to what extent would people be able to have their own, because it is not a one-size-fits-all.

Mr. STOCKTON. Absolutely not, no. Every model you put together, it has the technical background to it, but as people go through these shared vision planning, they identify what the goals and objectives are in the watershed and then you have the technical tools behind that to look at the trade offs of different alternative plans. And so people are very involved in it.

Mrs. NAPOLITANO. Does any of this look for the ability to be able to capture some of that watershed to run off into aquifers in the identification through USGS of those aquifers?

Mr. STOCKTON. Typically our primary mission areas are flood damage reduction, navigation and aquatic ecosystem restoration. So we typically don't look too hard at that. I think as we move into

more integrated water resource management comprehensive planning, we would want to look at those other alternatives.

Mrs. NAPOLITANO. Well, I certainly hope you do, because given the fact that we have climate warming and a lot of that runoff is going to waste sort of kind of, we need to understand that we need to begin to look at more storage, and above ground will be evaporated more quickly. USGS does only one aquifer study a year. I think we need to speed that up. So possibly working with USGS, and maybe having some joint working relationship about prioritizing areas that are heavily in need of the work and being able to bring all the other agencies to fore to assist in the projects.

Mr. STOCKTON. Yes, ma'am.

Mrs. NAPOLITANO. Does that make sense?

Mr. GALLOWAY. When we did the 1994 study after the 1993 Mississippi flood, we determined a lot of agencies as you have just described, would love to come to participate in collaborative planning, but they have no money. There needs to be, and we recommended provisions be made in the authorizations and appropriations for these different agencies, USGS, Department of the Interior, Fish and Wildlife, et cetera, to have funds to cooperate with the Corps of Engineers and not have to come to the Corps of Engineers for every nickel that they needed to do work.

And again, in spite of the fact that you would really like to work, if you don't have the money it is awfully hard to come to the party. And I think that's what we hope you could encourage in the appropriations for these agencies support for the comprehensive planing of the Corps.

Mrs. NAPOLITANO. And going back to Mr. Stockton, I am assuming that most Federal agencies do have the adequate authority or funding to do the comprehensive watershed planning or is new authority needed to make Federal agencies better partners?

Mr. STOCKTON. I think we have the authority to do that.

Mrs. NAPOLITANO. Well, explain.

Mr. STOCKTON. Well, it depends on each specific study authorization that we are provided.

Mrs. NAPOLITANO. Okay, okay.

Mr. STOCKTON. It tells us what the focus of that study is, whether it is navigation, flood , etc. Typically water supply is outside of our mission areas, so you get into storage, those kinds of things. It is really one of our silos that belongs to another agency or to the States. We only do it for multi purpose projects when it is ancillary to one of those specifically authorized purposes.

So yes, we would like to do it for watershed studies and, depending upon how they are authorized, we can do it. It is just that you need the appropriations necessary to actually engage the other Federal agencies, the State agencies, and the NGOs to bring them together.

Mrs. NAPOLITANO. Well, it made sense to do an overall approach, instead of just a single agency focusing on one thing without considering the rest. Thank you, Mr. Chair.

Mr. CARNAHAN. Next, I want to recognize Mr. Hall of New York.

Mr. HALL. Thank you, Mr. Chairman. In my district, which is part of the Delaware River Basin watershed and home to a number of other waters, watershed management is a serious concern. We

have had several major flooding events in the last few years. Three 50-year floods in the last 5 years to be exact. As I watch the news as the crest moves down the Mississippi River, I think we are all thinking about the old ways of managing watersheds versus the new ones that we may be moving toward.

Homeowners and local farmers are holding their breath alike, both in my district, the 19th district of New York which has the Hudson Valley, the Delaware Valley, the Minisink, the Wallkill, the 10 mile river, all of which, with the exception of the Hudson, has an amazing capacity, but all tributaries in Delaware and its tributaries have flooded numerous times in recent years.

So I am happy to see that both a number of you, if not all, are calling for an integrated holistic approach to watershed management. If management was fully integrated where would flood prevention fall as a priority? And what actions could be taken to combine for flood prevention with other goals? I guess I would start by asking Mr. Stockton.

Mr. STOCKTON. Clearly, water is one of those resources that has multiple uses and purposes in how you manage it. And I think the Delaware River Basin Commission is a perfect example of how you actually take all those competing interests, those needs for flood risk reduction, for water supply, for instream flows for environmental purposes and how you would strike those different balances. I would hope that public safety and protecting people's lives and properties would rank very high.

But it is all a question of tradeoffs and how you accept less risk in one area and perhaps you accept more risk in another one of those areas. So it really is part of the process.

Mr. HALL. Ms. Collier, would you like to weigh in?

Ms. COLLIER. Yes, sir, thank you. After those three floods, the four governors of the Basin came to DRBC and charged us with putting together an interstate flood mitigation task force to look at it holistically, knowing when they stood on one shore of the river, they could not solve the flooding problem. Two aspects came out of that, one, we had a quite diverse task force with Federal members, State members, nonprofits, et cetera came up with 45 recommendations, and then the four governors prioritized those, and we are working with the Federal agencies and the States to actually implement those priorities. One of which is looking across State boundaries on how DRBC might be able to use our authorities to have an umbrella water—excuse me, floodplain protection so that it is uniform on both sides of the river.

The other is, as you know, there is a strong cry for voids in the New York City reservoirs to catch some of that flood water. The governors provided us $500,000 and we received proposals from both Corps of Engineers and USGS to develop a model on how you can use the reservoirs of the Basin better for flood mitigation. Well, both those proposals were good. It goes back to the issue of what models best. We asked USGS and the Corps to get together in the same room and also include National Weather Service and see if they could come up with a proposal that used the best of the three agencies and they did. And I think we have a much better product because of it and we are also able to significantly able to leverage the dollars. We will have had a model this fall and then we will

have really good science basis to evaluate how best we should use the reservoirs.

Mr. HALL. Thank you, I have another fewer than 40 seconds left, so let me jump to Mr. Richter and ask in the Hudson Valley there are a number of environmental organizations and conservation groups that are looking at acquiring what they think will become the floodplain should ocean levels rise with climate change and the Hudson River, of course, is tidal all the way to Troy, so well past my district. The high tide will be considerably higher than it is now. Are you aware of or taking part in any similar——

Mr. RICHTER. Yes, and it is a very important example of how we can be proactive in our thinking about how we as a society are going to adapt to future climate change. Well, climate change is actually in front of us even today. And it falls in the category of there are of natures services or what a lot of the scientists are calling ecosystem services. So to recognize—the thing of a comprehensive watershed planning approach can enable us to do is to identify where there are areas in the watershed that need to be protected or reserved to provide the natural function of the storing flood waters.

Where are the parts of the watershed that need to be protected so that they can naturally recharge groundwater aquifers. In some cases, we have to undo some of the development that may have been done previously in order to regain some of those services, but that is very much along the lines of this comprehensive watershed planning that we have been talking about today is being able to recognize what are the healthy, natural functions of watersheds and trying to work with those to the greatest extent possible.

Mr. HALL. And if I may ask one more question, Mr. Chairman, of Dr. Galloway, perhaps as some of other witnesses have noticed watersheds don't respect human boundaries and they do cross over State lines as Mr. Richter said, we may have to find a balance between undoing some of the development that is already done to get rid of impervious surfaces and restore recharge areas and retention areas, grasslands, wetlands, forest lands that may have disappeared. Parts of my district, that would be impossible. Some parts are Orange County, in particular, has mostly undeveloped land area and has a lot of options open to them. And I am happy to say that the local and county governments are taking a very proactive and highly forward looking approach to this. And they have an opportunity to do things right. So the question is, is there a middle ground that could be effectively reached between the old way of flood control and the new?

Mr. GALLOWAY. Most certainly. I am a 20-year resident of Orange County, so I appreciate what you are talking about and the challenges you face. There has been development, some of it was wise, some of it was not wise. And I think you have to examine each and every case, but more important than thing else is to recognize the new paradigm and from now on, not move against the direction you want to go, not allow things to be built where you already recognize that if they are built, they are going to be problems for you. And I think that again, in New York State, there is such development in the lower part of the State that is going to be difficult to move everything out of the way of the rivers. Capture

what you can and certainly as you go north in Orange County north, there are opportunities that are certainly available.

Mr. HALL. Thank you very much, I yield back. Thank you, Mr. Chairman.

Mr. CARNAHAN. Thank you. We don't have any new questions, but I want to wrap up based on some of the testimony that we have heard here today. And in particular getting back to the structure of the Corps in terms of the project driven appropriations process, in terms of the cost share requirements for planning, the sort of lack of incentives involved in that process.

I guess my question to really any of the panel, but I want to start with Mr. Stockton, how do we break out of that structure? I would like to hear recommendations on how we can get from where we are to more comprehensive planning, more collaboration between Federal agencies and there and are there some State models out there that we should be looking at. Mr. Stockton, we will start with you.

Mr. STOCKTON. First of all going back to what Dr. Galloway said, we as a Nation back in the last century, really, did some innovative work in the Tennessee Valley and the Columbia River Basin and Missouri River Basin, and I think we cannot forget that. So we have a history of doing this, we just kind of forgot about doing it recently. And I think if I had to make one recommendation, it would be we need to incentivize the States in helping them do their watershed planning. I mean, Texas is very, very sophisticated. They are kind of our gold standard, Texas, California, Pennsylvania. There are really a number of States out there that have really done an incredible job. And so I think it is not anything new, but I think we do need to find ways to incentivize watershed planning on a comprehensive basis and to use that as a criteria for making Federal investments within a watershed as we go through our planning process for specific projects. I think we need to find ways to incentivize that.

Mr. CARNAHAN. Let me ask you to further elaborate. Can you give us examples of ways to provide those incentives that you think would work?

Mr. STOCKTON. Well, as we go through our planning process and our budgetary process, I think we could set budgetary priorities based upon if you had well-defined criteria for the type of watershed plans that need to be done and it would need to be defined, because there are a lot of different definitions out there of what it is. But for those States and watershed entities that had actually gone through the process, had an approved plan, they would get priority both within the planning process and the budgetary process for how we allocate those scarce Federal dollars and make those Federal investments as a way to incentivize good behavior.

Mr. CARNAHAN. Thank you. And I want to open it up to others on the panel. Mr. Freedman.

Mr. FREEDMAN. Yeah, I want to comment on that with kind of a general statement, the kind of advice I gave my children about life and that is that a vision without a plan is just fantasy and a plan without a vision is just activity. And so we need kind of both. We need to start at the stakeholder level and through a multi stakeholder process, we need to develop this collective vision. And

then we need a framework to implement a plan that is matched to the vision. Otherwise we can't get where we are going. And that plan you know we have talked about top down or bottom up, it really starts at both ends and kind of meets in the middle. The bottom part of it is the stakeholders, the local people, the local citizens. You have to identify what their issues and what their priorities and concerns are, whether it be groundwater or flooding or water quality or ecological protection. And then you need the strength and authority at the Federal level to integrate all the complex partners that you have in this. You know, you have Federal, State, municipal, tribal, you know, its quite complex. And the Federal framework needs to have the authority, needs to have funding and it needs to have some flexibility to make the right decisions. To focus on priority actions, not just programmatic activities, little check boxes where you, you know, you are meeting a particular act.

And sometimes that may mean that you don't spend money in one area that seems to be the prescriptive approach of a Federal program, but you reprioritize it in another area. Because all too often we are spending money on things that aren't really making a difference in terms of the objectives. And rather, we need to—combining that vision and that plan focus on the things that gets you the biggest benefit towards your vision.

Mr. CARNAHAN. Thank you. Any others?

Mr. MULLICAN. Mr. Chairman——

Mr. CARNAHAN. Let me go to Ms. Collier, she had her hand up first.

Ms. COLLIER. Thank you very much. I just want to mention that when we did our resource plan in 2004, we had about 48 different organizations represented at seven Federal agencies. We did this primarily within internal staff. I have a staff between 40 and 45, depending on how finances are, plus receiving a grant from a local philanthropic foundation to get a facilitator. But what is critical is there is an implementation phase afterwards. That is where having the Federal agencies as part of this plan is really critical. Because then we can sit down with them and carve out parts.

You know, what is it that the Corps can pick up the ball and lead with this. In fact, we were lucky enough to be one of the partners with the Corps on the pilot watershed studies in 2006. It was really based on priority needs identified in the plan. So it is financial incentives to do the plan, but then also as Mr. Stockton said have some carrot out there that if you do the plan according to key directions and priorities then you get a jump on the Federal agency funds.

Mr. CARNAHAN. Mr. Mullican.

Mr. MULLICAN. The Texas model also integrates into some incentives just as you asked about. And I thought I would just share with you our experience and the success that has had. In 1997 when Senate bill 1 passed, there were these two provisions that really did not get a lot of attention. One was if you want to come to the State for a water route permit for a project, it has to be in the plan.

Second one is if you want to come to the State for financing for a water supply project, it has to be in the plan. And nobody paid

much attention to it until 5 years later when the first State water plan came out under those provisions. And then all of a sudden, we had cities coming to the State for financing for water right permits and they realized that they had not participated in the planning process, and therefore the project that they were wanting to get financing or permitting for was not in the plan.

Well, why was that important? Because the plan was a comprehensive integrated plan that insured that there was not any overallocation of resources and that the decisions that were made or the strategies and projects had been vetted in a very public process.

So now that we have gone through the second round of that planning process, we have matured tremendously and the process has matured such that now all the municipalities are very aware of this requirement so that they are very active in participating in the planning process. And so what we have now is a situation where, for example, in July next month, we will be having our second round of applications coming in for water supply projects in this planning process. We have about somewhere in the neighborhood of $350 million available to allocate for financing those projects. And we are already anticipating of eligible projects from this planning effort that we are going to get over a billion dollars of applications.

So what happens then? Well as part of the law also since Senate bill 1 has passed, there have been additional provisions. For example, good water conservation plans, you have to have that as part of your application process. You can not come to the State for financing if you do not have a water conservation plan and are in the process of implementing that conservation plan. You have to have water loss audits, you have to submit those water loss audits in order to be able to get financing from the State.

So we have put in place a series of, call them carrots, call them sticks or whatever you want to call them. But we have put in place a process that incentivizes participation in the stakeholder-driven process that is done in a holistic, comprehensive manner such that in the end of projects that participated in that are the ones that are getting the advantages of the financing and permitting to move those projects forward to implementation.

Mr. CARNAHAN. Thank you again. Anybody else. Mr. Larson?

Mr. LARSON. What was described in Texas is also being used, for example, in California, their water resources projects and activities priorities are based on a check list. And the check list includes how many multiple objectives that particular activity is addressing. So if it is a single purpose activity, it is seldom going to get funded. FEMA does the same kind of things, for example, in its hazard mitigation projects that it funds under post disaster mitigation activities. Unless a community has a comprehensive community plan for hazard mitigation, it is not eligible for those kinds of funding. So these kinds of incentives, disincentives are critical. You can build in added incentives, for example, to say that activities must make sure that projects not adversely impacts other communities and other people now, but also in the future based on future conditions that we know are going to occur in terms of watershed development, in terms of climate change and those kinds of things. That

goes for urban flood protection as well as water quality and quantity issues throughout the watershed. So all of those things are important to moving us in that direction.

Mr. CARNAHAN. I thank all of you again. And on behalf of Chairwoman Johnson, I thank you for your time, your expertise that you share with us today. And the Subcommittee stands adjourned.

[Whereupon, at 3:50 p.m., the Subcommittee was adjourned.]

OPENING STATEMENT OF
THE HONORABLE RUSS CARNAHAN (MO-3)
HOUSE TRANSPORTATION AND INFRASTRUCTURE COMMITTEE
WATER RESOURCES AND ENVIRONMENT SUBCOMMITTEE

Hearing on
Comprehensive Watershed Management Planning
Tuesday, June 24, 2008

#####

Chairwoman Johnson and Ranking Member Boozman, thank you for holding this hearing on the comprehensive watershed management planning.

We have long known the importance of having a reliable water source for industrial and recreational use and for drinking water supply. As we see increasing competition for a limited water supply, a holistic watershed approach can provide an effective framework to address our water resource challenges. In using a watershed approach, we must engage a variety of water use disciplines to capture the full range of needs of watershed resources, rather than focusing on isolated water resource issues.

I believe there are several steps that must be taken to ensure we do not look at isolated water resource issues, but rather the full range of issues associated with a watershed. One key factor to capturing the full range of needs of a watershed is effective communication and coordination between federal and state agencies involved managing and using the watershed. Through efficient communication, duplicative and conflicting actions by different agencies can be reduced, as well as ensuring the collection of comprehensive data to make water management decisions. Additionally, at the federal level, inter-agency action and cooperation are essential for looking at comprehensive watershed concerns rather than agencies just focusing on their core missions. States must think of the larger watershed rather than just the part of the watershed that touches each individual state, because the management of a watershed in one state has an effect on the larger watershed. Finally, I believe in developing a comprehensive watershed management plan it is critical to recognize the each watershed across the country is unique. As a result, each watershed must develop its own planning criteria.

In closing, I want to thank our witnesses for joining us today and look forward to hearing their testimony.

#####

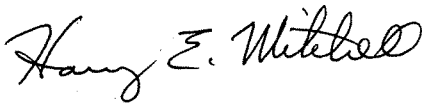
STATEMENT OF
THE HONORABLE JERRY F. COSTELLO
SUBCOMMITTEE ON WATER RESOURCES
HEARING ON COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING
JUNE 24, 2008

Thank you, Madame Chairwoman, for holding today's hearing on comprehensive watershed management and planning. This is an important issue to examine to make sure all levels of government and integral stakeholders are involved in watershed planning and management.

I believe we should embark on a comprehensive watershed management and planning approach given the condition of many coupled with water use conflicts and population pressures. In my congressional district, the Kaskaskia River and its watershed cover more than 10 percent of Illinois. Severe degradation has occurred because of flood control structures, roads, navigation channels, and agricultural runoff. As a result, in 1998, the Kaskaskia River was nominated under the American Heritage Rivers program, prompting local stakeholders to form the Kaskaskia Watershed Association (KWA). The KWA has worked to protect the watershed and balance navigation, recreation, water supply, conservation, sediment management, and other interests. I also worked with the KWA to

include a provision in the WRDA 2007 bill which furthered these unified planning and management efforts for the Kaskaskia watershed.

I welcome the witnesses here today, and look forward to their testimony.



Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Water Resources and Environment
6/24/08

--Thank you Madame Chairwoman.

--As you know, in Arizona, the importance of effectively managing our limited water resources cannot be overstated.

-- Without effective management, and continued access to clean, reliable sources of water, my desert district would literally be uninhabitable.

--Of course, scarcity is not the only threat against which we need to prepare.

--We need only look to Iowa, the Mississippi River Valley this week to remind us of the threat posed by excessive rain, and the interconnectedness of our river systems.

--I look forward to hearing from today's witnesses about comprehensive watershed management and planning.

--At this time, I yield back.

Delaware River Basin Commission

Statement

of

Carol R. Collier, P.P., AICP
Executive Director
Delaware River Basin Commission
P.O. Box 7360, 25 State Police Drive
West Trenton, NJ 08628-0360
609.883.9500
carol.collier@drbc.state.nj.us

before

The Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
United States House of Representatives

on

Comprehensive Watershed Management and Planning

June 24, 2008

Introduction

Madame Chair and members of the Subcommittee, I am Carol R. Collier, Executive Director of the Delaware River Basin Commission (DRBC). The DRBC is an interstate/federal commission, the mission of which is to manage water resources without regard to political boundaries. The members are the governors for the four basin states (NY, NJ, PA & DE) and the U.S. Army Corps of Engineers (USACE) Commander of the North Atlantic Division who represents the President and all federal agencies.

Thank you for inviting me to speak about my favorite topic – Comprehensive Watershed Management and Planning. I will discuss the value of water management at a watershed or basin scale, provide information on the Delaware River Basin Commission (DRBC) and why interstate river basin commissions are critical to successful water management in the United States.

The Value of Managing on a Watershed Basis and Problems with the Existing System

Water does not respect political boundaries. To effectively manage water resources it must be done on the river's terms – using geographic watershed boundaries, not political subdivisions. Of course, our socio-economic world is based on political boundaries, so we need to find a way to bring the two worlds together.

Unfortunately, as our environmental laws developed, aspects of water management were segmented, making it easier to regulate, but making it more difficult to assess multiple aspects on a watershed scale. We now have separate authorities for regulation of wastewater discharge, source water protection, water supply allocation, wetlands protection, stormwater management, flood loss reduction, and groundwater use. It made sense at the time, but now it's time to change and manage holistically.

Managing water resources on a project by project basis is not effective and can be more costly. Opportunities are missed. When looking across authorities, one can see that a downstream water quality problem or water supply shortage might be solved by implementing a better stormwater program in the upper watershed so more water is captured and infiltrated into the ground. This can improve stream base flow, assimilative capacity, and reduce pollutant loads. There is also the problem of unintended consequences. Designing a flood reduction structure without considering the hydrodynamics of the whole system could create downstream erosion and exacerbate flooding in other areas of the watershed. One must understand the whole watershed system in order to develop the best, cost-effective management strategy.

No one agency can manage water resources. Water management is a collaborative process. It takes all levels of government and stakeholders from different sectors of the watershed. Watershed planning is necessary to engage the stakeholders, build trust and develop a cost-effective strategy that uses the agency or group that is the best to complete an action. Federal agencies, state agencies, interstate basin

commissions, local governments, non-profit watershed organizations, and the private sector all bring expertise to the table and can beneficially add to the process. Holistic watershed planning allows the development of the best team.

DRBC works closely with many federal agencies, including the USACE, USGS, EPA, NOAA, USF&WS, NRCS, and NPS. They each have different sets of expertise and differing protocols for partnering and funding. We have found that the Corps of Engineers has the most difficult procedures since the funding is project based and not driven by priorities resulting from a watershed planning process.

Let me highlight two very different experiences in working with the Corps of Engineers. Some of our interactions with the Corps have not always been as easy or rewarding as they should be. Case in point – The DRBC led a 3 year effort developing a "Water Resources Plan for the Delaware River Basin," working with a stakeholder group of 48 representatives. The Plan sets direction for management of the basin for the next 30 years and was adopted by all four states and seven federal agencies. During the second year of plan development, the Corps received funding to do basin planning. Instead of using what had already been accomplished by the stakeholders, the Corps started at square one and sent out letters of inquiry as directed by their process. What a waste of time and money. This was not the fault of any one individual, but the regimented, project focused process that the District Office had to follow.

We had a very different experience when we recently worked with the Corps on the Multi-jurisdictional Use and Management Study. This was one of the pilot watershed studies initiated by the Secretary of the Army in 2006. We worked with the Corps' Philadelphia District developing a proposal based on priorities identified in our "Water Resources Plan for the Delaware River Basin," completed in 2004. We then worked with staff at the District Office to complete the required tasks. This initiative felt like we were partners in addressing needs identified in the Basin Plan.

Another example of the need for holistic watershed management is in the arena of flooding. Flooding seems to be on the increase in the United States as we are hit with increasing numbers of high intensity storms. The Delaware River Basin, after almost 50 years of no floods, had three large flood events between 2004 and 2006. The governors of our four states realized that you can not adequately plan for flood mitigation if you are only in charge of one side of the river. The governors charged DRBC with establishing and leading an Interstate Flood Task Force to prioritize actions across the basin. The Task Force proposed 45 specific recommendations; the states then developed a short list of prioritized projects, and we are working with federal agencies, (the Corps of Engineers, NOAA's National Weather Service and USGS) and the state agencies to implement the required actions.

The Delaware River Basin Commission

The Delaware River Basin is the longest un-dammed river in the eastern United States (see attached map). It drains portions of four states and provides drinking water to 15 million people, including New York City and Philadelphia. It is a small basin that serves a big need with over 8.5 billion gallons of water being withdrawn every day. Due to problems of drought, floods, and pollution, the Delaware River Basin Commission (DRBC) was formed in 1961, bringing the Governors of the four basin states and the federal government together to manage the water resources of the basin using the watershed boundary, not political boundaries. The formation of DRBC was signed into law by President Kennedy and ratified by Congress and the four basin states.

While DRBC has regulatory authority, the greatest value in my mind is that it serves as the coordinator of holistic watershed management and provides a forum to adapt policies and management strategies as issues change. We are able to implement the strategies through operating plans, such as for anticipated droughts, and impose the management approach of equitable allocations.

Much public attention has recently been focused on water supply-related tensions between Georgia, Alabama, and Florida during the historic drought of the Southeast. I believe the experience of the Delaware River Basin clearly demonstrates a much better way to address interstate water issues before they reach a crisis. No one can plan in the heat of a crisis.

The path of progress in the Delaware Basin has not always been smooth. Prior to the 1960s, the Delaware Valley was an arena of interstate conflict over water rights. Plans by New York City (NYC) to expand its reservoir system by exporting water out of the basin to the nation's largest city met with opposition among the three downstream states during the first half of the twentieth century. Efforts to resolve that interstate water dispute through discussions and negotiations were unsuccessful, so the states sued each other. The U.S. Supreme Court issued a 1954 decree in the case of New Jersey v. New York that established NYC's right to divert water from its three Delaware Basin reservoirs along with the right of the three lower basin states to compensating releases from those water supply reservoirs sufficient to maintain a minimum flow target about 80 miles downstream from where the main stem river begins.

When the Supreme Court settled that interstate conflict over 50 years ago, it did not guarantee a final resolution. To the contrary, the decree invited each of the parties – NYC and the four basin states – to resort to further litigation if circumstances changed. Instead of taking the litigious route, the four states and federal government in 1961 created the Delaware River Basin Commission (DRBC) to manage the shared waters without regard to political boundaries. This marked the first time that the federal government and a group of states joined together as equal partners in a river basin planning, development, and regulatory agency. Its five members include a federal representative selected by the president and the four basin state governors who directly, or through their appointed alternates, work together to foster and sustain a climate of

federal and state cooperation.

The compact creating the DRBC does not interfere with NYC's water allocation rights or the downstream states guaranteed minimum water flows under the decree, but it couples these guarantees with tremendous flexibility for the commission to address changing needs. The DRBC was given broad authority to plan, regulate and coordinate management of the basin's waters, including the authority to modify the terms of the 1954 decree upon unanimous consent of the five decree parties.

An early use of this adaptive management approach was demonstrated after the multi-year drought of the 1960s, when it was realized that there was not enough water to meet all of the decree's requirements. Instead of going back to the court, the DRBC undertook a series of "Good Faith Negotiations" to address drought releases. The result was an agreement in the early 1980s to ratchet down water diversions to NYC and downstream releases when reservoir storage declines, essentially "equalizing the hurt." In addition, another minimum flow target was established at the head of tide at Trenton. Freshwater flows must be maintained at Trenton to prevent salt water from creeping up from the bay and affecting the City of Philadelphia water supply and to maintain critical estuary biological communities. This agreement, along with an ambitious water conservation program, has carried the basin through multiple droughts and conserved billions of gallons of regional storage without the DRBC imposing mandatory water restrictions on industries and power generators.

Instream flow needs have presented the DRBC with another reason to review the original decree. Ecological and recreational issues unforeseen half a century ago are now a vital economic and social concern. Also, as is the case in the Southeast, federal law requires that river flows be managed to protect endangered species, like the dwarf wedgemussel found in the upper Delaware. Most recently, three serious floods between September 2004 and June 2006 have added yet another important management issue for consideration: the use of water supply reservoirs for flood mitigation. There is nothing static about managing a river system. Like any natural system, a river is dynamic, presenting new problems to solve around every bend.

In a report for the Institute of Water Resources of the U.S. Army Corps of Engineers, Bruce Hooper summed it up well when he wrote:

> *"Effective governance in the water sector is not linear, prescriptive and logical; rather it tends to be adaptive and 'messy', responding to the dynamic nature of the political and economic forces operating at the time, and in response to changing environmental conditions (floods, hurricanes, droughts)."*

The DRBC continually develops and assimilates new information and participants; works with its partners to build knowledge and consensus; and seeks creative, win-win solutions to water resource challenges. Indeed, its use of science, adaptation, and collaboration has realized accomplishments that a static, 50 year-old court decree could not achieve.

DRBC provides the forum for adaptive management. This is becoming ever more important with the speed of scientific discovery and development of sophisticated computer modeling. Addressing the uncertainties of climate change and the associated significant impacts on our water systems will also require an adaptive, holistic watershed approach.

River basin commissions like the DRBC are a sound and proven alternative to costly water wars. Our national water policies need to recognize their value as effective tools to address the many difficult water resource management issues facing the U.S.

Needs and Recommended Solutions

Need: - A mechanism to bring key policy makers together on a watershed basis.
Recommended Solution: - River basin commissions are the best option for large interstate rivers. The DRBC, Susquehanna River Basin Commission (SRBC) and the Interstate Commission for the Potomac River Basin (ICPRB) have state and federal members, thus bringing the critical decision makers to the table. We also have a number of advisory committees that provide a voice for non-profit, academic and the private sectors. There are 36 river basin commissions throughout the United States with differing levels of authority. The Interstate Council for Water Policy (ICWP) has information on these interstate organizations.

No one approach will be perfect for all watersheds or river basins, but if you do look at increased support for interstate basin organizations, they should be empowered to implement as well as to plan. There are lessons we can learn from other countries that have been conducting multi-party river basin management for many years; especially advanced are Europe and Australia. If interstate organizations are supported and encouraged, we can avert conflicts and be better prepared for environmental emergencies.

Need: - Defining the role of the federal government in watershed management
Recommended Solutions: -
1) Federal agencies should provide support to watershed management initiatives initiated by states or interstate organizations. This support can take different forms depending on the needs. Most often, technical expertise is required – developing a model, conducting monitoring, assessing alternatives, etc. For some situations, group facilitation and leadership may be required.

2) Federal agencies should be encouraged to work collaboratively so the best team is developed. As a case in point, DRBC received $500,000 from our four states to develop a model to assess how best to use our system of 15 reservoirs to improve flood mitigation. We received separate proposals from the USACE and USGS. Both were suitable, but not the best. We asked the Corps of Engineers, USGS and NOAA's National Weather Service to come together and submit a joint proposal. The

collaboration resulted in a far superior product, and we were able to leverage funds to make a stronger flood mitigation package.

Need: - Funding for Watershed Partnerships and Planning
Recommended Solutions: -
1) Provide funding for additional pilot watershed studies in the Corps of Engineers initiative and funds for the next phases of the five existing pilot studies.

2) Provide federal funding for the three river basin commissions that have the President's appointee as the official representative of all federal agencies. You can use the DRBC, SRBC, and the ICPRB as studies to evaluate how holistic watershed management should work and better define the federal role.

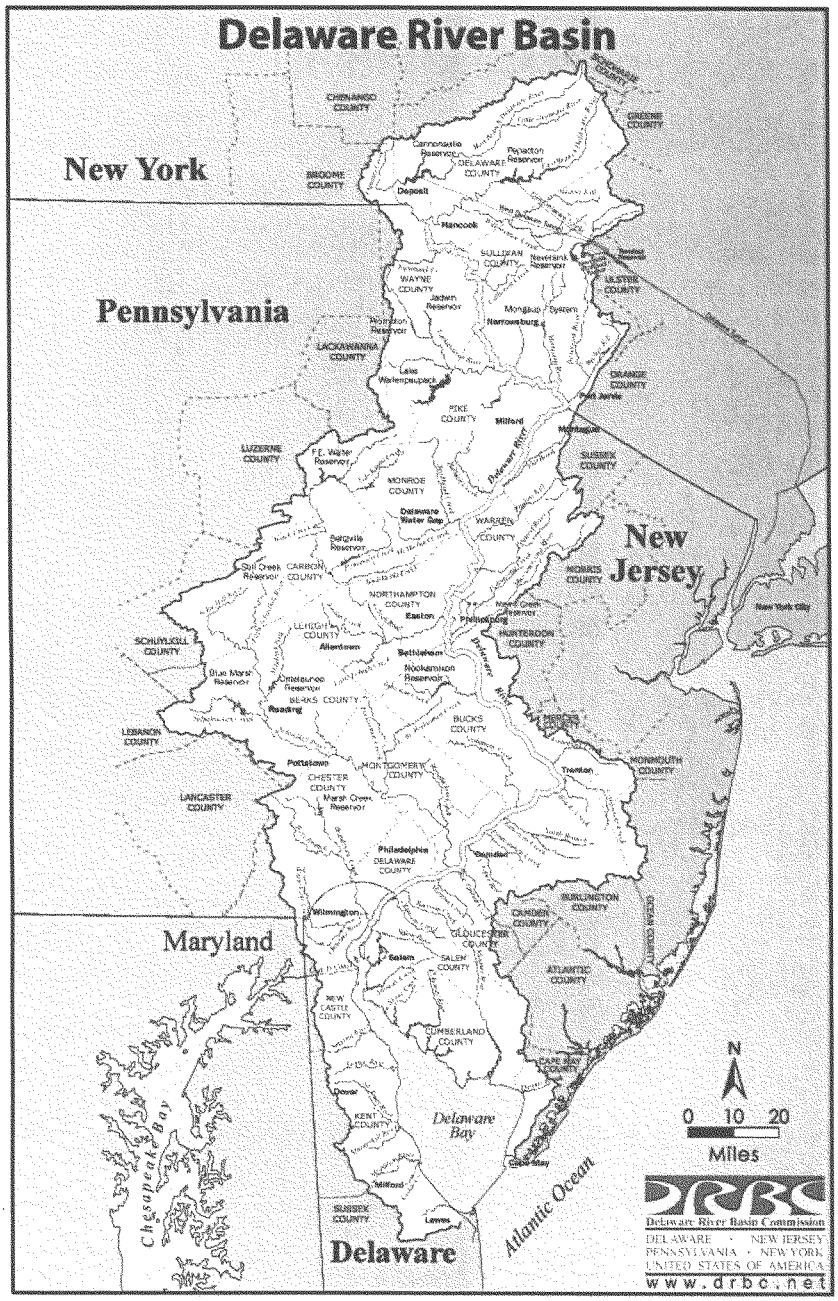
3) Provide funding that is not tied to specific projects to the Corps of Engineers Districts and other federal agencies so federal staff can participate in watershed planning initiatives. The initial stages of a watershed management strategy are spent developing trust among the watershed stakeholders. This is a critical step to establish buy-in from the key stakeholders and increase the chances of effective implementation. Often, the federal agencies are not able to participate in these early stages of watershed planning due to budget constraints.

Need: - Legislation to promote Holistic Watershed Management
Recommended Solution: - Legislation is needed that supports place-based, holistic water management. There are too many examples of ineffective programs that were developed only looking at one aspect of water system – e.g. water supply strategies that exacerbated flooding or negatively altered critical instream flow patterns. Even though it may take a bit longer, working through an integrated watershed planning process will result in more effective solutions, a better state of preparedness, and at less cost.

Thank you for this opportunity to present the DRBC views on Comprehensive Watershed Management and Planning. I would be glad to work with you and/or on a water committee to more thoroughly address the options.

Self-Evident Truths About Water Management

- Water does not respect political boundaries.
- Water should be managed on a holistic, watershed basis.
- What happens on the land affects streams and rivers. You can not manage water without managing the land.
- There is only one water system. We must consider ground water & surface water; stormwater, water supply and wastewater integrated as one system.
- We need to provide information about potable water availability and quality, and flood hazard areas, so industries and local governments can make educated decisions on siting new facilities and accommodating residential growth.
- Downstream water supplies are dependent on the actions of other users.
- Floods will occur. We can not stop the flood waters, but we can reduce the losses and damages from flooding. A floodplain is a natural extension of a river. It will flood. Strategies need to consider upstream solutions, as well as keeping people out of harms way and warning them of impending floods.
- When establishing a water allocation and reservoir release program, one must consider water supply, instream flow needs, and flood mitigation both downstream and upstream of the dam.
- River systems are surprisingly sensitive and can change quickly. We need to base our decisions on the range of conditions, not averages. Climate change will force us to consider even greater extremes.
- There is not enough water in the Delaware River Basin to support all uses in another drought of record.
- We do not know all the answers. We need a stronger base of science to support the decision makers.
- Water management is not unilateral; it is a collaborative process. We need to engage all levels of government, including federal, state, interstate, and municipal governments, and local stakeholders.
- The management system of a river must be adaptive. Changes occur in the underlying science, management alternatives, and regional priorities. A river basin commission provides the forum for adaptive management.


Delaware River Basin
New York
Pennsylvania
New Jersey
Maryland
Delaware
Delaware Bay
Atlantic Ocean
Chesapeake Bay
Cannonsville Reservoir
Pepacton Reservoir
DELAWARE COUNTY
BROOME COUNTY
CHENANGO COUNTY
GREENE COUNTY
Deposit
Hancock
SULLIVAN COUNTY
Neversink Reservoir
ULSTER COUNTY
WAYNE COUNTY
Jadwin Reservoir
Mongaup Reservoir
Narrowsburg
LACKAWANNA COUNTY
Lake Wallenpaupack
ORANGE COUNTY
PIKE COUNTY
Milford
Montague
LUZERNE COUNTY
F.E. Walter Reservoir
SUSSEX COUNTY
MONROE COUNTY
Delaware Water Gap
WARREN COUNTY
Belgrade Reservoir
Stillwater Reservoir
CARBON COUNTY
MORRIS COUNTY
NORTHAMPTON COUNTY
Easton
Merrill Creek Reservoir
Phillipsburg
HUNTERDON COUNTY
LEHIGH COUNTY
Allentown
Bethlehem
SCHUYLKILL COUNTY
Nockamixon Reservoir
Blue Marsh Reservoir
Ontelaunee Reservoir
BERKS COUNTY
Reading
BUCKS COUNTY
MERCER
LEBANON COUNTY
MONMOUTH COUNTY
Pottstown
MONTGOMERY COUNTY
Trenton
CHESTER COUNTY
LANCASTER COUNTY
Marsh Creek Reservoir
Philadelphia
DELAWARE COUNTY
Camden
BURLINGTON COUNTY
Wilmington
CAMDEN COUNTY
GLOUCESTER COUNTY
Salem
SALEM COUNTY
ATLANTIC COUNTY
NEW CASTLE COUNTY
CUMBERLAND COUNTY
CAPE MAY COUNTY
Dover
KENT COUNTY
Cape May
Milford
SUSSEX COUNTY
Lewes
N
0 10 20
Miles
Delaware River Basin Commission
DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA
www.drbc.net

COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING

TESTIMONY OF

PAUL L. FREEDMAN, P.E., BCEE

VICE PRESIDENT, WATER ENVIRONMENT FEDERATION

FOUNDER AND PRESIDENT, LIMNOTECH

BEFORE THE

WATER RESOURCES AND ENVIRONMENT SUBCOMMITTEE

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

U.S. HOUSE OF REPRESENTATIVES

JUNE 24, 2008

Good afternoon, Madam Chair and members of the Subcommittee. My name is Paul Freedman and I am the Vice President of the Water Environment Federation ("WEF"). WEF is a 34,000 member professional organization founded in 1928 and devoted to preservation and enhancement of the water environment. WEF members include scientists, engineers and other professionals working in the United States and around the world.

I am also the President of LimnoTech, an environmental consulting firm based in Ann Arbor, Michigan. Since co-founding LimnoTech more than 30 years ago, I have been personally engaged in over 300 projects emphasizing the use of advanced science and engineering to help clients and communities make the right decisions to solve their water related challenges. I have completed over 200 presentations and publications on water environment issues, including many on watershed management, and chaired five national technical conferences focused on watershed management, several of which were cosponsored by Federal agencies.

The watershed approach to water resources management is increasingly being recognized as the most appropriate way to identify problems, assess alternative solutions, and implement targeted corrective actions. The watershed approach involves use of the best technology and information available to characterize watershed conditions, and to develop sensible, consensus-based solutions to problems. WEF has long supported the watershed approach a logical basis for water resources planning and management. It is a comprehensive and integrated approach to manage and protect all water resources, including uplands, drainage basins, wetlands, surface waters, and

groundwater. The approach involves input from all stakeholders to establish priorities for addressing problems, setting goals, and taking actions.

Meeting New Challenges in Water Resources Management

During the first half of the twentieth century, water resources management focused mainly on flood control, land reclamation, and water supply issues. During the second half of the century, the focus shifted to water pollution. While we have made great progress in dealing with these challenges, twentieth century approaches will not meet the water resource challenges facing our Nation in the twenty-first century.

Today, a myriad of interrelated problems from water shortages to flooding and pollution are no longer local issues but major watershed-basin and ecosystem problems. We also must face the reality of planning for, and adapting to, the significant water resources impacts of climate change. Approaching these large-scale interrelated problems with segregated, or "siloed," programs will not produce the outcomes we desire, and in fact may compound some problems. My view is that comprehensive watershed or basin-wide planning and management is the only reasonable and sustainable approach. I justify this with four observations:

1. Current Programs are Limited in Scope

Although there are many effective Federal and State programs for dealing with issues such as flood management, water supply, and water pollution control, they have limited focus and scope. These programs may be effective in achieving narrow goals, but we have come to learn that today's water resource challenges cannot be addressed

independently. For example, the Truckee River Pyramid Lake system originating from Lake Tahoe is a heavily managed basin with multiple government actors involved; however, problems associated with flooding, water quality challenges, biologic impairments, dramatically lower lake levels, and significant water availability issues still exist. The problem stems from the approach taken - each issue and program has been addressed largely in isolation and the potential solutions have not been viewed holistically. Fortunately, the tide is turning in the Truckee basin and a comprehensive planning effort is underway.

The inter-relationships between flow management, storage and diversions, land use, and pollution control are undeniable. There are both direct relationships and unintended consequences; therefore, one cannot address any of these issues separately. To address water resources issues in a holistic and effective way, there needs to be a new emphasis on the coordination of interrelated but currently separate water programs and their potential benefits and impacts. Watershed management is the appropriate tool to reach for this goal.

2. Water Quality, Water Supply, and Flooding are Watershed-wide Challenges

Water quality, water supply, and flooding are no longer local problems but must be solved on a large watershed or basin scale. Often the solutions to these problems involve multiple local and State jurisdictions, tribal nations and, in many cases, Canada and Mexico. Examples of this are very evident; one needs only to look at the current flooding in the Midwest, a result of not only large storms but also the impacts of regional flood

control regimes, regional changes in land use, regional loss of wetlands, and region-wide land development in flood plains. The same is true for water shortages like those experienced in the Lake Lanier basin, which have implications throughout Georgia, Alabama, and Florida. It is obvious that the scale of today's problems is regional.

3. Managing Flows and Pollutants is no Longer Adequate

The historical approach to water resources management of focusing primarily on managing flows in waterways and pollutants from discharges is no longer adequate for large-scale problems. A hard lesson that we have learned after many years of experience is that in order to restore and manage our waters we have to focus on the land (see attached article, "Hard Lessons, Simple Truths"). How our waters flow off of lands, infiltrate, pond, or evaporate is critical to the nature of the hydrologic response in both surface waters and groundwater. Land use decisions and land-based processes have significant effects on flooding, water supply, sediment scour, and pollution loading.

For example, in the Gulf of Mexico we not only have a zone the size of Massachusetts that is void of oxygen, but we also are continuously losing acres and acres of delta. The hypoxic zone is more a result of run-off from agricultural areas and the loss of protective wetlands than the consequence of point-source discharges from wastewater or industrial facilities. Similar observations apply to management and restoration efforts for the Florida Everglades and fresh water supplies: what is needed there is not just pumping water and building more dikes but a total re-engineering of how water and land interact in

the region. Effective efforts to manage our water problems also require us to effectively manage our lands.

4. Intergovernmental and Interagency Cooperation is Essential

My last observation is that managing waters can no longer be accomplished through the actions of one agency. Effective management requires the collaborative efforts of Federal, State, tribal and local government, non-governmental organizations, and individual stakeholders. At the Federal level alone, we have a complex web of interrelated programs implemented by the Environmental Protection Agency, the Department of Interior Bureau of Reclamation, the Corps of Engineers, and the Department of Agriculture. This web of programs and agencies is not just intimidating; most agree it is also inefficient and often ineffective. This analysis does not even consider the complexities added by the constraints and expectations of local agencies, non-governmental organizations, the public, and tribal or foreign governments. Effective water resources management can only be accomplished by interagency and intergovernmental cooperation.

Essential Elements in Successful Watershed Management

Solving the large scale and scope of our twenty-first century water challenges requires a comprehensive watershed management approach. This is a concept well studied, and although awareness is widespread, effective use is limited. In my view, effective watershed management requires a few key elements, some of which are identified herein:

- **Problems and solutions need a large watershed outlook:** Today, effective water resources management and water quality planning need to be undertaken through large-scale efforts, using watersheds as the operating unit and then nesting watershed plans into basin plans. Problems are no longer local; no longer can local solutions and planning be expected to be effective.
- **Comprehensive focus on physical, chemical, and biologic issues:** Restoring and maintaining the functionality, safety, and utility of our Nation's waters requires a comprehensive approach that addresses different stressors and considers land, air, and water. The environment is an interrelated system, and physical, chemical and biologic issues cannot be separated. Solutions must include both land-based and water-based actions.
- **Focus on priority problems, not administrative programs:** Effectively implementing watershed management requires that we focus on high priority problems, with specific goals, and not waste energy and resources on issues that provide little or no benefit. Too many Federal and State programs focus on checking off boxes and not solving problems. Comprehensive, up-front assessments are needed to identify priority issues and focus limited resource on objectives that are important, not just administrative.
- **Comprehensive data and scientific information:** Today's water resource management problems are complex and solutions are expensive. As a result, our approaches must be based on comprehensive data and the best scientific information. Solutions must have political acceptance, but more importantly, they must be scientifically sound with assurance that they will meet objectives. Their

underpinnings must include reliable models that build on comprehensive data and good scientific assessments.

- **Multi-stakeholder and agency involvement:** With the large scope and implications of today's problems, wide political buy-in is key to successful implementation. In addition, existing Federal, State, and local laws are complex and often interrelated. Watershed planning must include comprehensive stakeholder involvement.
- **Integrated solutions:** Watershed management requires an assessment of the interrelated impacts and benefits of all actions in a watershed. All too often, solutions that consider only one objective lead to unintended and negative consequence for another important concern. Wide stakeholder involvement insures that the integrated effects of multiple actions are examined.
- **Adaptive flexible approaches:** Prescriptive approaches are effective for small-scale problems and problems where the scientific understanding is highly certain. Large-scale watershed management; however, involves significant expenditures in the face of inter-dependent problems and considerable scientific uncertainty. In these cases, it is essential to allow flexible approaches that allow for adaptive management, where priority actions are taken, progress is assessed, and additional steps are implemented as needed, with continuous progress towards solutions.
- **Build on the past, but focus on the future:** Effective watershed solutions must be designed to address both today's issues and future expectations. They must consider changes in population, land-use, and climate. In order to be sustainable, effective watershed management plans must be as effective and relevant under a range of possible futures as they are for today.

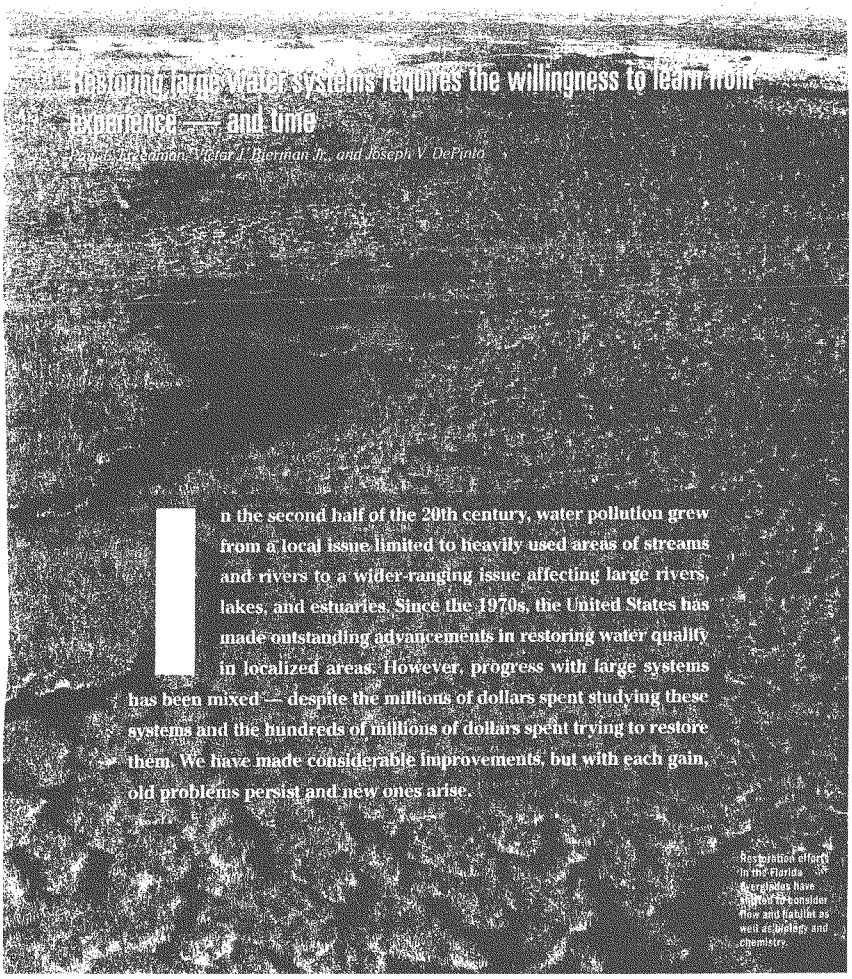
Those are some of the key elements of watershed management that in my view are critically important to successful outcomes.

The Clean Water Act is Not Adequate

The principal regulatory tool we have for watershed management is the Clean Water Act (CWA). Although the CWA has been identified as our most effective environmental statute and has been a useful tool to control point-source pollution, it is not adequate for the needs of integrated watershed approaches and provides no linkage to flood or water supply issues. I appreciate that this tool was created when issues were much different. As a result, it had limited focus and did not address issues such as flow management, ubiquitous non-point sources, atmospheric and legacy pollution, invasive species, habitat loss and land use changes. At that time, these issues were not understood to be critically important aspects to impairments of the physical, chemical, and biologic health of water bodies as well as to the safety of our public and the stability of our water supplies. Today, the issues are very different in nature, scale, and interdependence. Using the CWA to deal with today's water issues is like trying to use a 1972 repair manual to repair a 2008 automobile - it's just not relevant. A new manual needs to be written. We encourage the Subcommittee to take a serious look at the need for modernizing the Clean Water Act, and we pledge to work with you on this effort.

Thank you, Madam Chair and members of the Subcommittee, for the opportunity to speak before you today. I'd be happy to answer any questions and look forward to working with you to continue improving how water resources are managed in the United States.

HARD LESSONS, SIMPLE TRUTHS



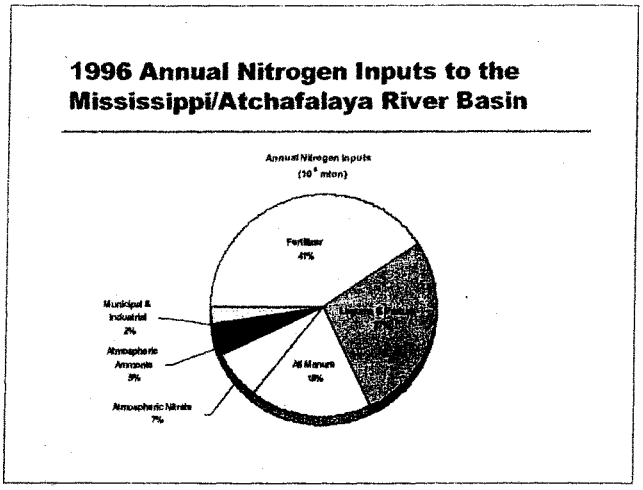
Restoring large water systems requires the willingness to learn from experience — and time

by Joel D. Scheman, Victor J. Bierman Jr., and Joseph V. DePinto

In the second half of the 20th century, water pollution grew from a local issue limited to heavily used areas of streams and rivers to a wider-ranging issue affecting large rivers, lakes, and estuaries. Since the 1970s, the United States has made outstanding advancements in restoring water quality in localized areas. However, progress with large systems has been mixed — despite the millions of dollars spent studying these systems and the hundreds of millions of dollars spent trying to restore them. We have made considerable improvements, but with each gain, old problems persist and new ones arise.

Restoration efforts in the Florida Everglades have started to consider flow and habitat as well as biology and chemistry.

Figure 1. Nitrogen Loadings to the Gulf of Mexico From the Mississippi River



Source: D. A. Goolsby et al (1999). *Flux and Sources of Nutrients in the Mississippi-Atchafalaya River Basin: Topic 3 Report for the Integrated Assessment on Hypoxia in the Gulf of Mexico*. National Oceanic and Atmospheric Administration.

This article explores some simple truths learned from this long and difficult history. Hopefully, these lessons will help us make better decisions in the future as we work to protect and restore large water systems.

To Restore the Water, Focus on the Land

The initial focus of pollution controls was on wastewater point sources, which the Clean Water Act (CWA) successfully has controlled through National Pollutant Discharge Elimination System permit requirements. However, nonpoint source pollution from land uses is growing and has become a regional and national issue. Long-term success in restoring large waterbodies now depends on controlling pollution sources from the entire watershed.

A 2000 national assessment by the U.S. Environmental Protection Agency (EPA) found that 90% of impaired waters are impaired at least in part because of nonpoint pollution sources. Approximately half are impaired solely by nonpoint or land use sources of pollution. Similarly, in large regional waterbodies, we have observed that nonpoint sources are a growing contributor to pollution. Controlling these sources is key to protecting and restoring water quality.

This truth is apparent when looking for solutions to the hypoxic zone in the northern Gulf of Mexico. An area of low dissolved oxygen — a "dead zone" — forms off the coast of Louisiana each summer. This dead zone is expanding, at times covering an area larger than the state of Massachusetts. Scientists have concluded that the increase in hypoxia correlates to a near-threefold increase in nitrogen load to the gulf since the 1950s. Most of this nitrogen load results from fertilizer application and agricultural practices in the Mississippi River Basin.

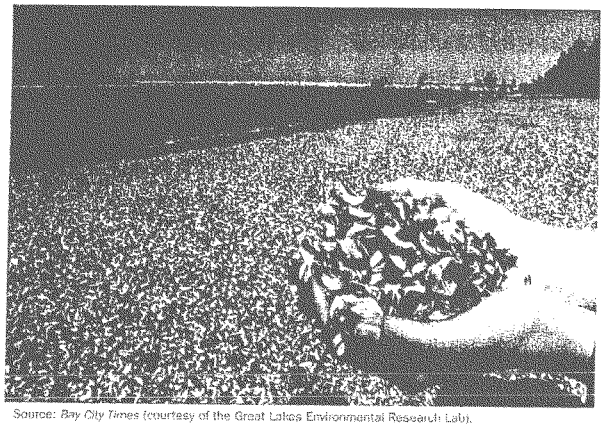
The Federal–State–Tribal Action Plan issued by EPA in 2001 for reducing hypoxia in the northern Gulf of Mexico included a goal to reduce the average size of the hypoxic zone to less than 5000 km² by 2015. Results from three different models suggest that a 40% to 45% percent reduction in nitrogen loads from the Mississippi River Basin may be necessary to achieve this goal. Unfortunately, CWA regulates only 2% of these loads, whereas 86% comes from agricultural sources (see Figure 1, above). Any significant reduction in gulf hypoxia will require us to focus on agricultural land uses and fertilizer practices.

The importance of nonpoint load sources of pollution is apparent in another prominent example, Chesapeake Bay. In 2003 the six bay watershed states and the District of Columbia agreed to new nutrient reduction goals that call for reducing annual nitrogen loads from 129 million kg (285 million lb) to no more than 79 million kg (175 million lb), a 39% reduction; and reducing annual phosphorus loads from 8.6 million kg (19.1 million lb) to no more than 5.8 million kg (12.8 million lb), a 33% reduction. However, extensive monitoring has shown that nonpoint sources, primarily from agriculture and urban runoff, contributed approximately two-thirds of the existing loads. Total elimination of all wastewater sources would only provide a little more than 20% reduction; hence, control of watershed land sources is key to ultimate restoration in the bay.

It is also evident we must control land sources in large inland waterbodies. For example, in the 1980s, Lake Erie was restored by both reducing municipal wastewater phosphorus and implementing best management practices on agricultural lands. Achieving the target phosphorus load of 11,000 tonne/yr required not only reducing the total phosphorus concentration in wastewater

treatment plant effluents but also reducing nonpoint sources by 50%. Most nonpoint source reductions were achieved by implementing voluntary low-till and no-till practices on agricultural lands. As a result of these efforts, Lake Erie was transformed from the pollution poster child with hypoxia and noxious algal blooms to a magnet for tourism with a world-class walleye fishery. This remarkable success story was realized only because we focused beyond CWA and focused on the land, as well as point sources. This needs to be the general paradigm for the future if we expect to make progress in restoring large water systems.

Figure 2. Zebra Mussels Along Great Lakes Shorelines



Source: *Bay City Times* (courtesy of the Great Lakes Environmental Research Lab).

To Control Pollution, Look Beyond Chemistry

Although the objective of CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," regulatory efforts focused on controlling sources of chemical pollutants. As progress has been made in controlling pollutant sources, we now see the importance of biological and physical elements to fully restoring uses.

Biological invaders can be a more significant stressor to waterbodies than pollutant sources.

The Great Lakes have been a perfect example

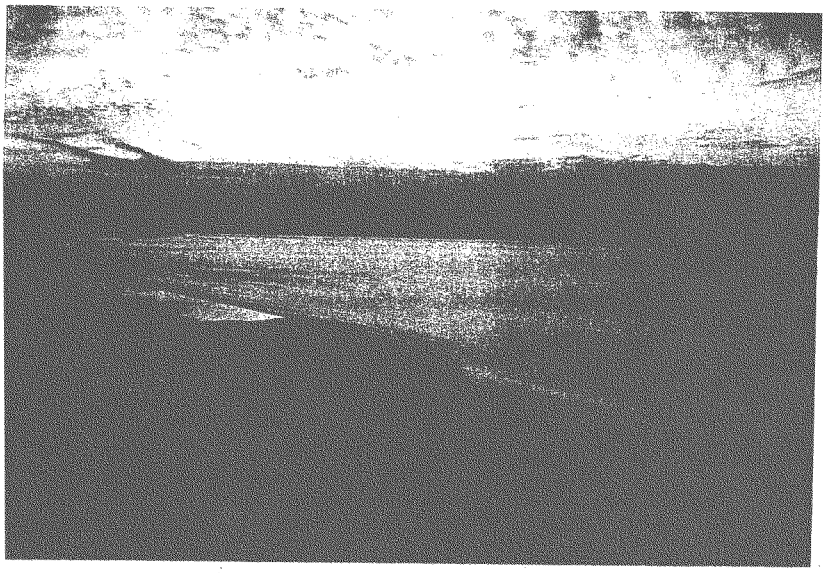
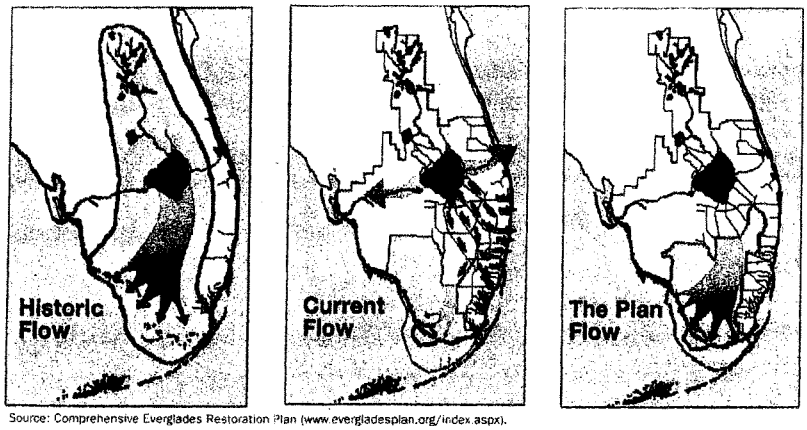


Figure 3. Restoration of the Everglades



Source: Comprehensive Everglades Restoration Plan (www.evergladesplan.org/index.aspx).

of this shift to other issues. In the 1970s and 1980s, we focused largely on controlling phosphorus loads, and then toxics. However, in the mid-1990s concurrent research revealed that the most significant factors affecting the overall ecological health of the Great Lakes were not wastewater pollutant sources but lost habitat and invasive species. This shook the conventional wisdom of many scientists and Great Lakes managers but now is well-recognized and a growing focus. Today, there are nearly 200 invasive species, many creating havoc to the ecosystem. Also, land use changes in favor of urbanization continue to threaten natural habitats, especially coastal habitat and wetlands, along much of the Great Lakes shoreline.

Biologic invaders have been a significant stressor in the Great Lakes. Although eutrophication in much of the Great Lakes was reversed in the 1980s by nutrient controls, today this problem is re-emerging, in large part because of the late-1980s invasion of zebra (*Dreissena polymorpha*) and quagga (*Dreissena bugensis*) mussels (see Figure 2, p. 59). Through extremely efficient particle filtration, these invaders have altered the ecological balance by

- outcompeting zooplankton and disrupting the food web;
- selective feeding that rejects most blue-green algae species, and hence has contributed to a re-emergence of late summer blue-green algal blooms in shallow areas;
- dominating bottom sediment habitat, causing declines in ecologically important benthic organisms, such as *Diporeia*, and limiting benthic diversity; and
- mobilizing phosphorus in the nearshore, leading to a re-emergence of benthic algal mats (*e.g., Cladophora*) in many areas.

There even is speculation that *Dreissena* has promoted the return and worsening of hypoxia in the central basin of Lake Erie by leading to an increase in sediment oxygen demand.

On the physical side of restoration, flow and physical habitat are also equally important as biology and chemistry to our national goals of restoring waters. For example, in the efforts to restore the Florida Everglades, initial efforts focused on reducing phosphorus loads for wetlands converted to agricultural uses. However, scientists soon realized that flow alterations were equally important. Current efforts are focused on "replumbing" the Everglades to restore the natural hydrologic cycles and habitat (see Figure 3, above).

In another example, protecting the Truckee River and Pyramid Lake in Nevada, modeling has shown that flow diversions from the Truckee River out of the basin have a greater impact than pollutant loads from the Reno area wastewater treatment plant. It is common in arid Western waters for water diversions to have a greater impact on water quality than wastewater pollutant inputs.

In a third example, the restoration efforts on Chesapeake Bay initially focused on nutrient and chlorophyll goals as targets. However, as research evolved, scientists and managers soon realized the importance of setting goals for improving water clarity and the re-establishment of shallow area plants. In 2003, the six bay watershed states and the District of Columbia

agreed to reduce baywide sediment loads and shoreline erosion in order to meet the 2010 goal of increasing bay grasses by two-thirds. Scientists believe this increased grass coverage will result in dramatic improvements throughout the entire bay ecosystem.

So, true to the CWA goal, to protect and restore large waterbodies, we need to focus on biology and physics, as well as on controlling pollutant loads to improve the chemistry.

Integrate Monitoring and Modeling

There often is a tension between empiricists who want to collect data to help understand how to restore large waterbodies and modelers who want to simulate the responses mathematically. The simple truth is that both monitoring and modeling are needed, since both are merely approximations of nature.

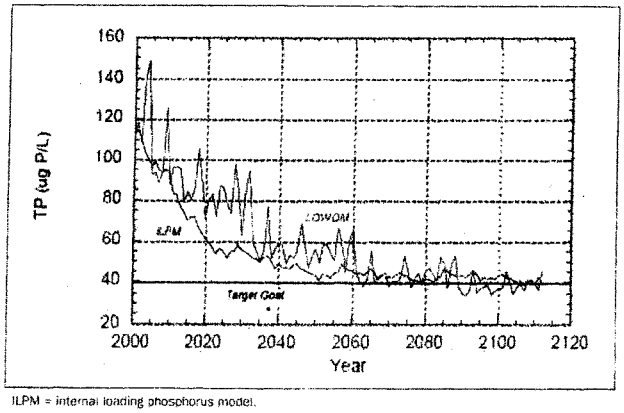
In any restoration study, it is necessary first to ask the management questions and then to design complementary monitoring and modeling programs that together provide the answers. Developing models early helps guide priorities for sampling and research, as well as being useful in screening alternative approaches for restoration. After some time, data become the foundation of reliable models, because only through data collection can the model be effectively validated, refined, and improved. However, a common theme in both monitoring and modeling is to start simple and progress in complexity and scope as understanding progresses and the nature of questions become more specific.

In every successful large-scale restoration effort, management decisions have been based on insights gained by integrating both monitoring and modeling programs. Ultimately, models validated with strong data were the tools that transformed unproductive debate about needed controls into effective negotiation and real action. This approach worked successfully in restoration efforts in the Great Lakes, Puget Sound, Chesapeake Bay, Meuse River Estuary, and Lake Okeechobee.

Models based on good data also are effective tools for clarifying unrealistic expectations. We all desire fully restored waters that are safe for all uses, but sometimes these expectations are unrealistic. Models are perfect tools for testing these realities. For example, in the Delaware River Estuary, levels of PCBs in fish exceed consumption guidelines, and a total maximum daily load was undertaken to help restore levels to safe concentrations. Initial expectations were that controlling point sources of PCBs would restore safe levels. However, models clearly showed that nonpoint, atmospheric, and sediment contributions that cannot be quickly controlled will confound attainment. As a result, stakeholders altered their expectations to more realistic schedules and goals.

The Potomac River Estuary serves as another example of effectively integrating models and data. In the 1970s, an aggressive phosphorus control program was undertaken based on modeling analysis that indicated reductions were required to eliminate noxious algal blooms. However, in 1983, a massive bloom occurred, and data suggested to some that the modeling and phosphorus control strategy were flawed and that controls were needed to decrease nitrogen instead of phosphorus. However, an integrated monitoring and modeling program demonstrated that the bloom was a result of peculiar environmental conditions that year and a massive sediment release of phosphorus. The phosphorus control strategy was deemed sound and proved

Figure 4. Phosphorus Levels in Lake Okeechobee



ILPM = internal loading phosphorus model.
LOWQM = Lake Okeechobee water quality model.

Adapted from Blasland, Bouck & Lee (2003). *Evaluation of Alternatives, Lake Okeechobee Sediment Management Feasibility Study, South Florida Water Management District* (C-11650).

For More Information

Chesapeake Bay Program
www.chesapeakebay.net

Delaware River
www.state.nj.us/drbc

Florida Everglades and Lake Okeechobee
www.evergladesplan.org/index.aspx and www.dep.state.fl.us/water/tmdl

Great Lakes Regional Collaboration
www.glrc.us

Hudson River
www.epa.gov/hudson

Mississippi River and Gulf of Mexico Hypoxia
www.epa.gov/msbasin

State of the Lakes Ecosystem Conference
www.epa.gov/glnpo/solec

U.S. EPA Water Quality Assessment
www.epa.gov/305b

ultimately successful for the Potomac. Neither modeling nor data alone were sufficient to answer this critical management query confidently. (Nitrogen controls ultimately were added more than a decade later, but only because modeling showed they were needed mainly to protect Chesapeake Bay, not the Potomac itself.)

So the adage is, in order to develop effective restoration plans, ask your questions first, then use an integrated program of modeling and monitoring that directly addresses those key questions in a progressive fashion.

Keep an Eye on the Long Term

In the environmental field, we were able to accomplish quick restorations in small systems, but larger systems typically have much longer response times. Additionally, the precision of our forecasts is limited. Given the natural variability in the environment and the long response times, it is not uncommon to see things get worse before they get better.

Many of these large systems took decades to pollute and likely will take decades to restore. For example, PCB contamination in the Upper Hudson River, even under aggressive dredging plans, will take more than 35 years to achieve restoration goals. A Lake Ontario PCB model has determined that even after eliminating all loads to the lake, feedback from historically contaminated sediments in the system will slow its recovery such that it will take approximately 30 years for PCBs in fish to be reduced to acceptable levels.

To meet phosphorus standards under a proposed total maximum daily load scenario, it will take Lake Okeechobee as long as 50 years, during which time conditions in any given year are predicted to get worse due to annual variations (see Figure 4, p. 61). These annual variations also can create misleading trends, as is evident in the Gulf of Mexico, where the areal extent of hypoxia has varied tenfold and more due to droughts, high flows, and storm events — not because of restoration progress or worsening trends.

In large systems such as these with large annual variations, long-term trends can be assessed only by examining long-term data sets, coupled with modeling interpretation.

Replace Impatience With Persistence

We live in an impatient society that wants answers and results fast. We all want to see our large waters restored to swimmable fishable conditions quickly, but the simple truth is that success requires putting aside our impatience and replacing it with persistence by making progressive steps towards improvement.

With all the advances in science and computers, the public has come to believe that answers to all our environmental challenges can be obtained and achieved easily. However, the simple truth is that we often are uncertain what goals to set and what steps will help us reach them.

It is difficult to understand, let alone control, all factors affecting progress in the restorations of large systems. Therefore, the key to success is to take incremental steps coupled with scientific evaluation and then additional steps. This adaptive management approach is the best path toward successful restoration.

The adaptive approach is used widely in resource management and now is being called for as a new paradigm in water quality management. If we are committed to restoring these large waterbodies, the simple truth is that we need persistence, patience, and an adaptive approach — because there are no simple answers

Paul L. Freedman *is founder and president and* ***Joseph V. DePinto*** *is a senior research scientist at Limno-Tech Inc. (Ann Arbor, Mich.).* ***Victor J. Bierman Jr.*** *is a senior research scientist in the Greensboro, N.C., office of Limno-Tech.*

Statement of
Gerald E. Galloway, PE, PhD
Glenn L. Martin Institute Professor of Engineering
The Water Policy Collaborative
University of Maryland, College Park, MD 20742
to the
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and the Environment
US House of Representatives
June 24, 2008

Comprehensive Watershed Management and Planning

Chairman Johnson, Members of the Committee. It is a distinct privilege to participate in this important and timely hearing and I want to thank the Committee for the opportunity.

I am Gerald E. Galloway, a Glenn L. Martin Institute Professor of Engineering and Affiliate Professor of Public Policy at the University of Maryland where I teach and do research in water resources. I came to that position following a 38 year career in the US Army and eight years service in the federal government, most of which was associated with water resources management. I served for three years as District Engineer for the Corps of Engineers in Vicksburg, MS and later, for seven years as a member of the Mississippi River Commission. I also serve, on a part-time basis, as a visiting scholar at the Corps of Engineers Institute of Water Resources in Alexandria, VA and as a consultant to a number of organizations. In 1993 and 1994, I was privileged to be assigned to the White House to lead an interagency study of the causes of the Great Mississippi River Flood of 1993 and to make recommendations concerning the nation's floodplain management program.[1]

I come today to speak to the need for a focus on watershed planning and management as we continue the development, maintenance and restoration of our nation's water resources. Hurricane Katrina, the Great Mississippi flood of 1993, and the current flooding in the Upper Mississippi Basin point to the need to deal with water resource issues in their watershed context. Our water resources cannot be sustainably, efficiently and safely developed if we continue to address problems within a watershed on a project by project basis

A watershed is an area of land that drains water and the sediments and other materials it carries into a common river or outlet. It can be small, with a few acres, or large, such as the Mississippi watershed, which drains 41% of the contiguous United States. Larger watersheds are typically identified as basins and in many countries, watersheds are called catchments. Today I will use the terms watershed and basin interchangeably.

Watershed planning and management address land and water resources use on a watershed basis to achieve desired environmental, social, and economic goals. This planning and management activity recognizes linkages among land use, soil loss conservation, water quantity and quality,

ecosystem dynamics, as well as social and economic factors. It also considers the relationships between upstream and downstream activities within the watershed.[1]

Watershed planning and management require that when taking action within a basin you consider the impact of that action throughout the basin, not only for the purposes for which the action is being taken such as flood control, but also for its interaction with all the other water uses in the basin such as hydropower, navigation, and water quality. Much credit is given, deservedly, to the Environmental Protection Agency (EPA) for what it labels a watershed approach; however, since it generally deals only with a subset of the water resources - water quality - it is not accomplishing true watershed planning and management.

Few people would disagree with the need for watershed planning and management and that where it has been properly used it has brought large rewards. A shining example of a watershed approach is found in the Tennessee Valley where in 1933 the President formed the TVA to develop the water and related land resources of the Tennessee Valley watershed in their entirety to serve multiple purposes. According to TVA, "Right from the start, [it] established a unique problem-solving approach to fulfilling its mission-integrated resource management. Each issue TVA faced—whether it was power production, navigation, flood control, malaria prevention, reforestation, or erosion control—was studied in its broadest context. TVA weighed each issue in relation to the others."[2] It also gave us the first illustration of what we now call Integrated Water Resources Management (IWRM).

In the 1960s, the Mississippi River Commission, which had been acting as an integrating mechanism for water resources development in the lower Mississippi Valley since 1879, carried out a comprehensive study of the water resources needs in the Valley. It recommended a framework program to "serve as both a short- and long-range guide in planning for the conservation, development, and beneficial use of the water and related land resources in the study region."[3] Since 1928, the commission has carefully managed navigation, flood control and related land resource activities to include environmental mitigation in the Lower Valley, treating it as an integrated watershed and operating it as a systems-based Mississippi River and Tributaries project.

Following the disastrous Great Mississippi Flood of 1993, a White House study team recommended that, in order to bring together the disparate activities of flood damage reduction in the upper Mississippi basin, the Congress assign responsibility to the Mississippi River Commission for that activity and establish an upper Mississippi River and Tributaries project.[4] No action was taken on this recommendation, and as we see today, the flood damage reduction activity remains disjointed and in need of reform.

On the negative side, failing to see the need for integration can have serious consequences. We all recognize that, for nearly 40 years, the nation invested heavily in hurricane protection for New Orleans through construction of levees and other structures without recognizing that the wetlands of the coastal Louisiana watershed were key elements of a natural/structural system that provided storm buffering for New Orleans and protection for the oil, gas, shipping, and fisheries industries that generate revenues for the state and the nation and sustain critical ecosystems.

If watershed planning and management make sense, why are they not being accomplished? There are several reasons:

- Institutional rivalries and authorities result in stovepipe approaches. When the Corps of Engineers was conducting its study of upper Mississippi navigation, its authorizations for the study included navigation, flood control and environmental restoration. As noted by a committee of the National Academies studying the project, because water quality issues to include sediment movement and other erosion fall under EPA and the Natural Resources Conservation Service (NRCS) and not the Corps, consideration of their impact on the navigation and the environment were not included in the Corps study. Similarly when the Corps conducted its review of the operations of the Missouri River-the so-called Master manual review - its focus was on mainstem flows and the purposes for which the Corps was authorized to operate the Missouri system - navigation, flood control, hydropower, and the impact of these operations on fish and wildlife. Because activities of the Bureau of Reclamation and the NRCS were outside the authorities of the Corps, there was no attempt to review how joint operation of the several hundred Bureau of Reclamation, NRCS, and private structures within the basin might improve the operation of the basin as a whole. Neither did the study examine how water quality and sediment flows might be improved through operation the basin as a system and what impacts this might have on a sediment deprived lower Mississippi River or the growing hypoxic zone at the Mouth of the Mississippi.

- The nature of the Congressional process supports this silo approach in dealing with activities in the watershed. In 1997, following the major flooding on the Red River of the North that inundated Grand Forks, East Grand Forks and other communities in North Dakota and Minnesota, Congress directed the Corps to both examine the basin as a whole and develop specific projects for the damaged communities. Appropriations were initially made available for both purposes but over time, interest in basin planning waned and the funds were directed to solving the immediate problems in Grand Forks and East Grand Forks and these projects have been completed. Yet today we still do not have a long term plans for the remainder of the basin or a good understanding of what new projects will do to the fragile level of safety that currently exists in the Canadian cities within the basin. History will show case after case where individual projects were authorized and funded without any consideration of the impact of these projects in the basin in which they exist. The Association of State Floodplain Managers efforts to promote a concept of "No Adverse Impact" in development of floodplains speak well to the watershed concept.

Watershed planning is not new. In 1927, Congress directed the Corps of Engineers to conduct comprehensive river basin studies across United States.[5] These studies provided the basis for much of the work that took place in the 1930s and 1940s including the TVA and work in the Columbia Basin. Unfortunately, when the President suggested expanding the TVA concept to other basins, the pushback from across the country was enormous as Governors, federal bureaucracies and private power providers saw a threat in basin authorities to their interests.

In 1965, under the Water Resources Planning Act, Congress authorized the creation of voluntary federal-regional-state basin commissions to deal with issues in large basins and six commissions were formed. However, these basin commissions were eliminated by President Reagan in 1983 because they were seen by many to have become large bureaucracies and, to the states, to be intruding on the authorities of the states. Although there was hope that states would form organizations to coordinate regional water planning, the hope has not materialized. In effect we have had little effective basin or watershed planning in this country over the last 25 years. While reforms to the basin planning process were certainly needed, the elimination of basin commissions became a case of throwing out the baby with the bathwater

What then is required to get watershed/basin level planning off the ground?

- There must be better coordination among federal agencies and the states within the basins.

- There must be better coordination among Congressional committees authorizing and funding water programs and their committee reports must reflect their interest in basin and watershed planning.

The Administration, Congress and the states must develop an approach for management of activities within the watershed. This can be basin commissions or some other structure to coordinate the efforts of the federal and state agencies. One federal agency could be assigned as federal watershed integrator charged with coordinating the federal activities within the basin and leading the interaction with the states in the basin. States could be given the responsibility with the federal government in a supporting role. The current work of the state of Texas on its state water plan illustrates this bottoms-up approach very well.

One hundred years ago, when our nation was expanding its boundaries, the opportunity for basin level planning was neither technically nor politically feasible. It would have been difficult to know what was going on a timely basis throughout a large watershed so that one agency could lead the effective use of the resources of that basin. Now, with modern technology, the needed information can be rapidly assembled, analyzed and given to those people and agencies that will make the decisions

Our expertise with the tools – models and techniques – needed for comprehensive planning has also improved and the nation has become more aware of the inter-linkages among the various components of its water resources. Finally, stakeholders are now much more able to participate in the technical aspects of water planning, and increasingly, are demanding that involvement. That is a good thing. And we, as a water community, are beginning to develop approaches to breach those silo walls. For example, when I was with the International Joint Commission, I supported an approach called shared vision planning in the five year study of a new plan for Lake Ontario regulation. During that study, the commissioners, scientists and stakeholders worked together using this approach. Everyone got a chance to suggest new ideas for regulating water levels and flows, and together they designed a single computer simulation that tracked all the impacts that participants said they worried about. This didn't magically eliminate the differences in values among stakeholders, and now that the study is done and the IJC has issued a draft decision, there is still conflict about the best solution. But because of the shared vision

approach, the arguments are much more about values than facts, the differences are more manageable, and we can chart a much clearer path with adaptive management to an even better solution over time. This approach has been successfully applied in other studies since the early 1990s, and the International Joint Commission decided to use it again for its study of the Upper Great Lakes. More and more states are incorporating this approach into state water planning. Similar Computer Aided Dispute Resolution methods are being used in Europe and Australia.

The National Science and Technology Council's Subcommittee on Water Availability and Quality has recognized the importance of these ideas and developed an interagency initiative focusing on this integration of computer tools within multi-stakeholder public decision process for water management. The Corps, USGS, Sandia National Laboratories, the U.S. Institute for Environmental Conflict Resolution, and other federal partners are participating [6]

While the United States has put watershed planning on the back burner, other nations have not. There are lessons we can learn by observing the ongoing actions of those who are already implementing large-scale watershed planning and its corollary integrated water resource management.

A 2000 European Union Water Framework Directive established a legal framework to protect and restore clean water across Europe and ensure its long-term, sustainable use.[7] This water framework directive outlines the responsibilities of EU nations within multi-nation river basins for the integration of their activities both within the national areas and across international boundaries and calls for the use of integrated water resources management. The EU notes that:

> The best model for a single system of water management is management by river basin - the natural geographical and hydrological unit - instead of according to administrative or political boundaries. Initiatives taken forward by the States concerned for the Maas, Schelde or Rhine river basins have served as positive examples of this approach, with their cooperation and joint objective-setting across Member State borders, or in the case of the Rhine even beyond the EU territory. While several Member States already take a river basin approach, this is at present not the case everywhere. For each river basin district - some of which will traverse national frontiers - a "river basin management plan" will need to be established and updated every six years, and this will provide the context for the co-ordination requirements identified above.

Over the past eight years, the nations of the EU have been working diligently to ensure that each and every water resource related action is examined in the context of how it will affect the other aspects of water resources in the shared basins and watersheds. Understanding that upstream pollution has significant impacts downstream and acting on this knowledge has improved relationships among the nations and has resulted in water resources that are more sustainable.

Australia has long faced severe water shortages in many parts of its country and, over the last two decades, has turned to watershed management to ensure that its waters are used effectively and that decision-makers consider the balance among the multiple uses of this resource.

The Australians speak to Integrated Catchment Management (ICM). Since Australia is a federation of states implementation falls to the state level. The national government provides for comprehensive water reform and policy directions through various incentive programs and, to the extent possible, avoids intruding in actions that are considered states' rights. (roles and responsibilities)

An Australian colleague of mine, Dr Bruce Hooper, offered me his assessment of the Australian experience with basin management noting that:

- Success occurred in most states where there was:
  - Strong local leadership by catchment management organizations who coordinated with State and Federal government and irrigation & ranching sector groups to solve mutual problems (salinity, eutrophication, land degradation),
  - Clear specification of roles and responsibilities of stakeholders (by catchment organizations, government agencies, individuals, water utilities),
  - Demonstrated improvements in the short term in resource condition (which were monitored and reported)
  - Ongoing national funding and use of cost-sharing contributions by stakeholders.
- Success has occurred in large basin ICM (Murray-Darling especially) due to:
  - Recognition of a common threat (salinity)
  - Top-down political leadership from Australian Government while recognizing States' water rights and contributions to local land and water management programmes through funding partnerships;
  - Emerging use of environmental water allocations;
  - Effective community involvement at top levels through the 22-member Community Advisory Committee of the MDB Commission;
  - Ongoing commitment by Federal Government to funding despite different political parties in power over 20 years.
- Bottom-up meets top-down is a major challenge to implementing ICM:
  - There remain few coordination mechanisms between Local Governments and catchment management organizations; There is an emerging concentration of power in the 2000's by some State Government agencies, withdrawing funding and reducing the roles of catchment management organizations.[8]

Like the European nations, Australia has found that the integration that is achieved through catchment management has reduced conflicts over water, improved the efficiency of the use of the resource and more fully involved the stakeholders in solving the problems the nation faces.

Watershed planning eliminates long-term problems. I would urge the Congress to carefully examine the projects it authorizes to ensure that these projects, as authorized, are set within a watershed context and that the authorization and eventual funding by the Congress is not creating problems. Some will say that it is a responsibility of the agencies to identify such

problems, but I should note that since projects are approved on an individual basis by Congress without the consideration of basin/watershed needs, it is almost impossible for a federal agency to develop broad scale watershed approaches simply because they not given the fund nor the authorities for such activities/

Much of the information that is needed for effective watershed planning is here. More is certainly required to do it well, but that is not a reason stop forward movement using watershed-based approaches. I would urge Congress to authorize and fund Federal agencies working in coordination with the states to develop and implement standard practices for watershed planning and management based on the principles of proven advances such as shared vision planning.

Thank you for your attention.

---

[1] Interagency Floodplain Management Review Committee, Executive Office of the President. 1994. *Sharing the Challenge: Floodplain Management into the 21st Century.* Washington, GPO. (available at http://www.floods.org/Publications/free.asp).
[2] See UCCE Rangeland Fact Sheet 33 at http://danr.ucop.edu/uccelr/h33.htm
[3] http://stinet.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA041343
[4] Interagency Floodplain Management Review Committee, Executive Office of the President. 1994. *Sharing the Challenge: Floodplain Management into the 21st Century.* Washington, GPO. (available at http://www.floods.org/Publications/free.asp).
[5] 21 January 1927, Public Law 560, 7Oth Congress --River and Harbor Act.
[6] www.iwr.usace.army.mil/CADRe/).
[7] Its official title is *Directive 2000/60/EC of the European Parliament and of the Council of 23 October2000 establishing a framework for Community action in the field of water policy.*
[8] Personal correspondence, Dr Bruce Hooper, DHI, June 6, 2008

ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.
2809 Fish Hatchery Rd., Suite 204, Madison, Wisconsin 53713 www.floods.org
Phone: 608-274-0123 Fax: 608-274-0696 Email: asfpm@floods.org

TESTIMONY

Association of State Floodplain Managers

before the
House Transportation and Infrastructure Subcommittee on Water Resources and Environment

Comprehensive Watershed Management and Planning

Presented By:
Larry A. Larson, P.E. CFM
ASFPM Executive Director

June 24, 2008

Background

The Association of State Floodplain Managers (ASFPM) envisions a number of key legislative policy changes in how the nation manages our watersheds in order to strengthen the programs that address water resources, public safety and socially and economically sustainable communities. Today we focus on a number of federal programs that sometimes work together and sometimes work at cross purposes. We appreciate the opportunity to discuss those with you today.

ASFPM and its 27 Chapters represent over 12,000 state and local officials and other professionals who are engaged at the ground level in all aspects of watershed management, including management of natural hazards and natural resources. These include land management, mapping, water quantity and quality management, wetlands management, engineering, planning, building codes and permits, community development, hydrology, forecasting, emergency response, water resources and insurance. Our state and local officials are the federal government's partners in implementing programs and working to achieve effectiveness in meeting our shared objectives. For more information about the Association, please visit http://www.floods.org.

Once again we are seeing devastating floods in the Midwest---likely billions in losses to farms, homes, businesses and infrastructure. Many of our members work for or with communities that are right now struggling to recover from flooding and will then be reviewing options and developing mitigation plans to reduce losses from the next flood. Most of these same areas were devastated by flooding in 1993, and Gerry Galloway led an interagency team to produce an analysis and series of recommendations in a report called: Sharing the Challenge". Unfortunately, very few of those recommendations have been implemented. I will not repeat them, since I assume Mr. Galloway will do so, and he has written a number of papers reviewing that lack of action.

The recent flooding tragedies in the Midwest again demonstrated some major problems with how we manage our watersheds in this nation. While many people seem to think the recent flooding was "unexpected" or unpredictable" the history in our nation and the world provide ample evidence that large natural disasters occur frequently and with a vengeance. While that flooding was occurring, it brought to light vivid examples of the failure of some of the nation's watershed management approaches:

- water pollution when waste treatment plants are flooded and inoperable,
- critical facilities like hospitals, fire stations, water systems out of operation because they were not located out of flood risk areas
- social disruption of hundreds of communities,
- businesses out of operation for long periods of time because
    - they were directly impacted by floods or
    - because their workers homes were flooded or
    - they could not get to work when roads were washed out;
- the community drinking water supply was contaminated--undrinkable
- levee design levels that are inadequate for urban areas led to numerous and catastrophic levee failures and levee overtopping
- Major bridges and roads were washed out, under water, or closed due to

exigent conditions
- Rail and transit such as Amtrak significantly impacted

All of these occurrences demonstrate problems with some aspect of how we manage watersheds----not just in how we manage floods or natural hazards.

Future trends that will impact watershed management approaches

In spite of heavy investment of public and private dollars and many decades of various programs of management, the impacts listed above continue, not just in this last flood, but many times in many ways. At the outset of the 21st century, unprecedented conditions—in the form of population growth and migration, changes in climate, and serious degradation of water-based resources—have entered the stage. They are colliding with the cumulative impacts of the last century's well-meaning but misguided policies, which have led to:

- failure to provide for the maintenance of infrastructure,
- short term economic development at the expense of natural resources,
- sustainability approaches that do not consider all elements of sustainability,
- incentives for development that result in urban sprawl and
- Transportation systems that focus primarily on roads and automobiles,
- farming programs that encouraged the draining of wetlands and use of marginal land for production,
- programs that address water quality without addressing water quantity,
- overreliance on engineering solutions for flood loss reduction—
- minimal support for non-structural adjustments to hazards reduction

All of these have combined to overwhelm current attempts to protect water-based resources and to reduce flood losses in our watersheds.

Without dramatic shifts in our approaches and actions, by 2050 flood losses are likely to be far greater, ecosystems may well collapse, the nation's quality of life will be diminished, and all hope of sustainable communities will be lost.

The trends for the next 50 years are dramatic and if we remain on the current path, we will likely see the following:

- add 100—150 million people to the U.S.---to about 450 million people
- increased urbanization, much of it in high risk hazard areas
- federal discretionary money all but disappears
- programs devolved from federal to state and local governments
- people want more from government with less taxes
- shrinking from personal responsibility
- private capital abounds, but needs to be harnessed for public good
- loss of natural ecosystems—and collapse of some
- technology and information overload—not always science based
- more intensive storms throughout the nation--climate change
- flood and hurricane losses will be horrific
- sea level rise threatens communities/business/infrastructure

- degrading and failing infrastructure that has been already ignored for 50 years-levees, dams, bridges, roads, water supply and waste systems,
- hope for sustainable communities will be lost

Some Historical Perspective
Watershed management in the U.S. has occurred in a haphazard fashion. Programs have been created separately, and implemented through stove piped programs. Water quality and water quantity programs are prime watershed management examples. Water resources development over the past 70 years has been justified by leveraging the economics on the back of destroyed natural and water resources.

Stovepiped Programs--At the federal level, which is mirrored among most states, water-related programs are stovepiped, with program coordination and cooperation occurring only on an *ad hoc* basis. Programs for flood management, water quality, habitat maintenance, dam safety, levee safety, stormwater, fisheries, watershed protection, and others are not integrated even though they are all based on the same inseparable land and water resources. Wasteful duplication of effort takes place across the board. Since the early 1980's there is virtually no federal leadership for the integration of water-related issues and programs within and among the levels of government and the private sector

Loss of Natural Resources--Because land and water were not treated as finite resources in federal policy we have seen many decades of continual degradation of resources. Some estuarine ecosystems will likely collapse. Vast acreages of coastal marshes have disappeared. There has been a notable increase in severe, localized water crises. Periodically, stormwater runoff in some urban areas is almost unmanageable. Groundwater supplies have diminished. Localized droughts are common. The shortage of fresh water is a matter of serious concern.

Increased flood levels--The urbanization of watersheds that has occurred continuously since the 1900s, along with impacts of predicted climate change results in the higher projected (and actual) flood levels in many locations throughout the United States. Millions of homes and other buildings that were elevated to projected 100-year flood levels based on earlier circumstances are now or will be below that level—sometimes far below. The idea of elevating buildings to a "safe" level may prove to be a futile goal. Whether elevated on fill or on piers or foundations, homes may be repeatedly isolated from the outside world (including emergency services) during times of high water— during disastrous flooding when several levees may fail. During those floods in the future, rescue workers, and fire and police personnel will be put at risk when tens of thousands of elevated structures are rendered inaccessible for months. The added cost of providing protection from fires, looting, and other dangers during those circumstances adds enormous financial burdens to the already-stricken local and state governments.
By 2050, numerous coastal buildings previously thought to be "safe" may be particularly hard hit by rising flood levels, if individuals and governments are unwilling to engage in strategic retreat from the shoreline and instead rely on engineered designs and construction standards that purport to ensure safety.

Federal leadership and standards for infrastructure and construction-- Federal agencies have been directed since 1977, through Executive Order 11988, to consider the flood hazard in siting or funding projects. However, in the decades since the issuance of this Executive Order, there has been inadequate enforcement of the order's provisions. Without adherence to the mandated standards or procedures, federally supported facilities, licenses, and infrastructure encourage a proliferation of development in and near floodprone areas.

It is critical to have consistently applied standards for selecting safer locations or requiring mitigation measures for such critical facilities as public buildings, roads, hospitals, fire and police stations, communications systems, power plants, and water and wastewater treatment facilities. The standards that do exist are unevenly implemented. Certain facilities, such as water treatment plants, too often are located in floodprone areas, precipitating subsequent arguments that flood control structures are needed to protect them. Facilities that in earlier years were considered not prone to flood hazard now are or will be exposed, both because of the rising flood levels brought by urbanization and changes in climate and because of more accurate estimates of flood levels.

By 2050 we will need far more infrastructure and public facilities to serve the higher-densit development, but planning and designing the facilities will be more complicated than in earli years because of changes in watershed conditions, concentration of people, and the need t account for evacuation of large populations. In the absence of clear, well-enforced, and ampl funded programs for maintenance, infrastructure that is already aging will continue to deteriorat or collapse.

Disaster relief--The media has a tendency to dramatize all extreme events, glorify "victims," and hurry to cast blame. Even though public safety has always been the clear responsibility and primary function of local government, since the 1990s federal agencies have been highly visible in the media after disastrous floods and hurricanes, leading the public to believe that the federal government should and always will be on the spot, and that taking care of flooding is a federal job. In that environment, it is no wonder that federal officials continue to promise to deliver assistance and even pledge to make people "whole" again, even though the latter is neither possible nor their legal or financial responsibility.

The availability of federal relief after a disaster, especially in the form of public assistance to local governments, seriously undermines the cost-sharing arrangement required for taking mitigation action. Thus, those communities who do the least to reduce flood damage and flood risk to their citizens over the decades are rewarded with federal relief dollars while those communities that take action struggle to find funding. As a result relatively few localities and states manage to implement comprehensive flood mitigation measures in a watershed context. **An especially abhorrent situation is where a community can get disaster assistance for restoring public facilities even if it refuses to join the National Flood Insurance Program**----this must be reversed to place the cost on those who can create the problem.

People look first to the federal government for compensation for their losses after a disaster. In the absence of adequate compensation from that source, filing a lawsuit against localities,

engineers, designers, builders, and others will be a commonplace avenue of redress. The long and costly litigation process ties up the legal system, directs resources to attorneys, courts, expert witnesses, and others instead of those who were damaged by flooding, and favors those who can afford it, leaving economically disadvantaged parties without recourse.

Structural flood control--most of our structural flood control measures like levees, floodwalls, dams, and artificial channels are being overwhelmed by increasingly larger events. In some cases, development has resulted in more runoff and flooding that outpaces the structures' design levels. In others, maintenance procedures are faulty. In many places floods and storms increase in intensity, catastrophic events damage the structures, or their useful design life simply passed.

The single-purpose structural solutions preferred by many residents and communities in past decades have brought drawbacks that often outweigh their benefits. These drawbacks include encouraging "protected" development that may be protected from smaller floods, but is subject to catastrophic losses in larger flood events, to residual risk, the non-stop expense and diligence of maintenance, and the virtually assured liability that will ensue should the facility design be exceeded or fail. Flood-related lawsuits over flood damage stemming from structural flood control measures have proliferated. As technology and knowledge increase our ability to predict the cause and degree of flooding, owners of structures are less likely to escape liability by offering an "act of God" defense. Additionally, flood insurance is not required for development in areas protected by structural flood control. This gives residents a false sense of security and transfers the flood risk to the government.

Agriculture practices—Current programs for agriculture, combined with water resources policy provide some incentives that sometimes work against the public interest. For example, significant agricultural subsidies for water supply or crops can result in putting marginal land into production, or intensifying ag use on sensitive lands or lands where runoff from pesticides, herbicides or fertilizer have undesirable consequences, such as the dead zone in the Gulf of Mexico. All of these issues can be addressed through a comprehensive approach to watershed management—with a focus on integrating water quantity and quality management.

Recommendations
The ASFPM recommendations are made in light of not only current concerns and issues, but of the trends noted above. These recommendations are intended to foster change in how we manage our land and water resources, using watershed based approaches.

The specific recommendations ASFPM is making to the Committee are:

1. Comprehensive Watershed Management

Congress could consider passage of a **national water resources and floodplain management policy,** implemented through holistic techniques for ensuring both water quality and quantity and applied by state and local governments. The centerpiece of the policy could be that no unmitigated adverse impacts to locally designated values are permitted by public or private actions. **The federal government must provide leadership through a coordinating**

and integrating body for all programs, policies, and disciplines that have to do with water resources. The agricultural sector and the floodplain management profession would be allies in preserving sensible uses of riparian and watershed areas.

In the case of **land use, every state should be encouraged to have comprehensive land use planning** that begins with a template of watershed based land and water and related resources and hazards. Proposals for economic development, transportation, infrastructure, and other community concerns would be evaluated within the context of that template, with the objective of allowing no adverse impact on flooding, on other properties, or on the natural functions or resources.

2. Rooms for Rivers and Oceans.

Many **no-build zones**—such as deep coastal storm surge zones, deep riverine floodplains, and other high-hazard or environmentally sensitive areas—should be identified, analogous to the floodways and coastal barrier resources system units. These no-build areas would be respected in order to sustain the natural benefits they provide to society, including high-quality water, appropriate habitat for commercial and sport fishing, wildlife, and flora; groundwater recharge; recreation; and open spaces, in addition to flood damage abatement.

We need to begin a pattern of gradual and voluntary relocation or strategic retreat from the highest-risk and most ecologically sensitive areas, with climate change and long-term sustainability both in mind. State mitigation plans could incorporate strategies for vacating certain areas and converting them to safer, more natural uses; no federal dollars should be allowed to be spent on development in these areas. The Congress could encourage this through incentives to local and state government where the federal funding would be offset by savings in disaster relief

3. Reverse perverse incentives in government program

An independent, comprehensive review is needed of all federal programs that fund, subsidize, license, or promote development or redevelopment (including disaster relief, the tax code, housing grants, small business loans, and many others). **All of these programs should be reformed to eliminate the incentives they unwittingly provide for making unwise decisions and taking inappropriate action.** In their place, we must create positive incentives for appropriate action anywhere in the watershed, but especially in areas that are floodprone and/or ecologically sensitive.

Federal monies should not place people and structures at risk, nor contribute to the increased flood risk of structures and people. Many agencies will spend billions in taxpayer monies for efforts to rebuild after the Midwest floods. This includes the Corps of Engineers, FEMA, HUD, EDA, EPA, SBA and DOT. It is imperative those agencies do not increase flood risk, or cause flood risk to be increased through their actions or support. Federal Executive Order # 11988 directs all federal agencies to analyze their actions to avoid increasing flood risk by their actions to build, finance or provide technical assistance. **We**

urge this Subcommittee to conduct oversight of each program authorization to assure compliance with this Executive Order.

Federal agencies should adhere closely to E.O. 11988 and 11990 to eliminate federal projects, funding, licenses, permits, loans, grants, or other incentives that foster new or replacement development in floodplains that exposes people, property and taxpayers to added risk and costs. Public facilities such as causeways, bridges, roads that serve as evacuation routes, and water treatment plants should be treated as additional "critical facilities" under the terms of the Executive Orders

4. Restore and enhance the natural, beneficial functions of riverine and coastal areas.

A concentrated effort must be made to reclaim lost riparian and coastal resources wherever possible, including dunes, bottomland forests, estuaries, and marshes. This will help restore natural buffers to storms and floods, supply open space and recreational opportunities for a burgeoning population, and prevent some ecosystems from further deterioration. This should become a national priority. Sources of generous funding from all possible sources must be identified

Recognition and respect for the natural and beneficial functions of floodprone areas, including the coast, must be incorporated into and implemented through the programs of all federal, state, and local agencies. The value of these functions has been acknowledged officially and repeatedly as preventing serious harm to people, the environment, and the public good, and therefore worthy of protection, restoration, and enhancement.

5. Generate a renaissance in water resources governance.

A nationwide vision and policy for water resources and flood loss reduction is essential. This would include both a national floodplain management policy act and a national riparian and coastal areas policy act. Both should establish unequivocally the value to the nation of these resource areas and their natural functions, as well as their inherent hazardousness. **This policy needs to be supported with a comprehensive legislative package to be coordinated with and implemented through states, local governments, tribes, governors, and others.** We need to draw on the leaders and experts of the nation to craft and agree on outcomes and metrics for the future, including how we measure success and failure.

The federal government should not be the "doer" in managing our watersheds or water resources. **The focus for managing watersheds must be the states, where the authority for land use and development and public safety are reserved by our constitution.** There is an important federal role—that of being facilitators and providing technical assistance. There are good examples of such programs in the USACE now---Floodplain Management Services and Planning Assistance to States. Under the "Silver Jackets" program using FPMS the Corps has done some small pilots in Ohio that bring together federal agencies to provide technical assistance to a state and locally led effort for planning watershed solutions.

The federal agencies can also led a national effort in scenario based planning that would run a number or scenarios of national watershed policy to see the range of impacts that will occur to our economy, environment and social and cultural values. Using the variety of outcomes as a guide, Congress, the Administration and the States can better guide which policies will produce the most long term sustainable results for the nation's citizens. As part of that effort, establishing standards for national data sets is a critical federal role. While some of that data, such as critical streamgage data, should be federal responsibility, many times standards for the data and requiring open sharing of data will be sufficient.

To develop this vision, we must first address the central question of whether a national policy of water resources "development" is still relevant or whether a policy of water resources "sustainability" that balances human and ecosystem needs is a wiser approach. The revisions to the USACE Principle and Guidelines must address this need.

The National Water Assessment, last conducted in 1976, needs to be updated. Current data on streamflow, reservoirs, groundwater, and consumptive use is critical to crafting nationwide policy that is both far-seeing and grounded in factual science.

National programs and investment decisions should be adapted quickly to account for expected trends and impacts associated with the collision of intensified human development and climate change. Particular attention should be given to those parts of the nation where the geographically specific impacts on flood severity and frequency are likely to be most severe, and on the ecosystems of our riparian and coastal zones.

6. Promote personal and public responsibility

We need to require all properties, nationwide, to have actuarially based all-hazards insurance that has a strong loss-reduction (mitigation) component. This will foster individual understanding of risk and acceptance of personal responsibility. If an all-hazards insurance program cannot be developed, then flood insurance under the existing mechanisms should be made mandatory.

We need to provide a framework that will foster local responsibility for water-related resources, flood risk, and wise use of all watershed lands. An ethic of land and water stewardship must be developed. Incentives need to be institutionalized to ensure that communities that are doing a good job get benefits and those that do not manage their risks and resources wisely are not able to externalize the resulting losses and costs to the federal taxpayers. These incentives could include a sliding scale for the non-federal share of the cost of disaster relief and recovery; and preference for federal grants and loans awarded to

communities that take action to mitigate risks and protect or restore resources through comprehensive watershed management and planning. Through these means we can build local capacity for water resources management---and similar capacity at the state level.

Much of this issue comes down to 'who pays". As long as property owners and communities and states think the federal taxpayers will pay for unwise decisions that have dramatic adverse costs and consequences, they do not view this as the shared partnership it needs to be.

Sustainable communities are a vision of everyone. And that **sustainability must mean not only sustainable in terms of economics and environment, but socially and culturally, with full public safety from natural hazards as well as human induced hazards. Now and in the future that must be part and parcel of any sustainable community.**

Wise watershed management and planning will take the combined efforts of all levels of government, the private sector and individuals. ASFPM stands ready to assist Congress in its efforts to foster that vision.

Conclusion

Again referring to the vast consequences of the current Midwest floods---**it is critical that we have programs, policies and institutions that can adequately handle these events, efficiently use taxpayer money, and build a more sustainable future.** Nothing less than our nation's prosperity and economic security are at stake. The Congress and this Committee are at the center of this discussion with an opportunity to make policy changes that can have importance and relevance far into the future.

The ASFPM represents the federal government's state and local partners in the continuing quest to manage our watersheds wisely. Today, we once again stand at a crossroads--with an opportunity for all of us to work together to refine national water policy that will serve the nation for decades to come. Thank you for the opportunity to provide the wisdom and expertise of our members on these important issues. We look forward to working with you as we move toward these important common goals.

For more information, please contact Larry Larson, ASFPM Executive Director (608) 274-0123 (larry@floods.org),

ASFPM testimony House T&I 6-24-08

Testimony before the

Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
United States House of Representatives

"Comprehensive Watershed Management and Planning"

Tuesday, June 24, 2008
2:00 p.m.
Room 2167
Rayburn House Office Building
Washington, DC

Written Testimony of:

William F. Mullican III
Deputy Executive Administrator
Water Science and Conservation
Texas Water Development Board
1700 Congress Avenue
P.O. Box 13231
Austin, TX 78711-3231
Tele: 512-936-0813

Complete Statement

of

William F. Mullican III
Deputy Executive Administrator
for Water Science and Conservation
Texas Water Development Board

before

The Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
United States House of Representatives

on

Comprehensive Watershed Management and Planning

June 24, 2008

INTRODUCTION

Madam Chair and Distinguished Members of the Subcommittee:

Thank you for the opportunity to testify before you on Comprehensive Watershed Management and Planning. I am testifying today in my capacity as Deputy Executive Administrator for Water Science and Conservation at the Texas Water Development Board (Board). The Board is the state agency charged with collecting and disseminating water-related data, assisting with regional water planning, and preparing the state water plan for the development, management, and conservation of Texas' water resources. The Board also administers cost-effective financial programs for constructing water supply, water infrastructure, wastewater treatment, flood control, and agricultural water conservation projects.

Most recently, the Texas Legislature designated the Board as the lead state agency for coordinating the National Flood Insurance Program in Texas. The Board also provides financial assistance for flood mitigation planning and flood control projects.

Please allow me to take a moment to once again thank Chairwoman Johnson for her strong support of Texas water issues and of the Board, in particular. This subcommittee, along with Committee Chairman Oberstar, has been and continues to be extremely receptive and accommodating to the Board's insights on water resources policy of benefit to Texas and the entire nation. It is an honor and privilege for the Board to maintain a supporting role to the subcommittee.

The subcommittee's commitment to the consideration of water resources issues is commendable. The importance of water to the nation's economy, environment and public health is beyond measure. As drought, climate variability, population trends and socio-economic changes impact this resource, we must find better ways to share and conserve our water. With all of the complexities we face in the 21st century, we must transition our focus toward truly comprehensive watershed planning and management, which integrates a multitude of issues, including not only water supply, but also water quality, flood control, environmental sustainability, land use practices, and economic development.

WHAT IS WATERSHED PLANNING?

The call for watershed planning is almost universal, yet a universal definition of watershed planning eludes us. The Board is involved in a variety of venues that provide an opportunity to deliberate on the necessity for a more comprehensive watershed planning approach. Board staff have interacted with the U.S. Army Corps of Engineers, Federal Emergency Management Agency, Environmental Protection Agency, Bureau of Reclamation, Natural Resources Conservation Service, and the U.S. Geological Survey on this very issue, to name a few. It is my sense that, despite the great number of water resources experts within each of these agencies, not one singular definition, description, or goal of comprehensive watershed planning exists today. Of course, valid reasons can be identified for this lack of uniformity, most notably the fact that each federal agency has a distinct mission, which may conflict with, or duplicate that of other agencies. Although the notion of watershed planning has matured and gained significant momentum, we still are in need of a definitive mission and goal to ensure that we move watershed planning from a preferred concept to a viable, workable approach. So our first task must be to develop a mutual understanding of what it is and how it can help us to better manage the resource. Please allow me to be bold and offer my working definition of what comprehensive watershed planning should include. Comprehensive watershed planning in the 21st century should be a process initiated and led by stakeholders whereby to the greatest extent possible, physical, chemical, biological, and socio-economic characteristics of a watershed are evaluated and the results of that evaluation are integrated. Upon completing this integration, challenges and opportunities are to be identified and prioritized, anticipated or projected changes to the watershed such as a new water supply project, a change in land use or climate variability are then thoroughly evaluated with respect to their affects on physical, chemical, biological, and socio-economic characteristics of the watershed. Based on this analysis, management objectives, recommendations, strategies and projects are identified, evaluated, and prioritized. Finally, once the comprehensive watershed plan, containing any adopted strategies has been finalized, then a systematic process should be established to monitor progress of plan implementation along with opportunities to refine and revise the plan as new data becomes available or unanticipated changes occur.

Texas initiated steps to implement watershed planning with the advent of what we call Senate Bill 1, the landmark water legislation passed by the Texas Legislature and signed into law in 1997 by then-Governor George W. Bush. Senate Bill 1 greatly increased public participation in water supply planning by implementing a bottom-up local and regional planning process that emphasizes conservation, increases protection of the environment, and promotes voluntary water transfers through marketing. To carry out this approach, Texas divided the state into 16 planning regions, delineated roughly along major watersheds and aquifers.

The process allows for a wide variety of stakeholders to provide input on the most efficient and effective way for using water resources in the watershed to meet future water supply needs. The Texas model, with respect to comprehensive watershed planning however, comes up short in that our regional planning approach focuses primarily on water supply. Truly comprehensive watershed planning should not only address water supply issues, but also integrate considerations of water quality, flood control, the environment, land use, socio-economics, climate variability and sedimentation and erosion. For example, our current planning process will examine the impact of a proposed water supply project located in the headwaters of a watershed on existing water supplies elsewhere in the watershed. However, the process would not include a comprehensive investigation of the potential positive and negative effects of the proposed water supply project on wastewater treatment capacities, environmental resources, water quality, flood control, and land use.

It must be recognized that we as a nation, whether at the federal, state, regional, or local level, can no longer afford the expense, inefficiency, and ineffectiveness of parsed or fragmented watershed planning efforts wherein only water quality issues, for example, are evaluated, without considering the consequences of the planning decisions on other vitally important components of the watershed, water supply and socio-economics for example.

THE TEXAS EXPERIENCE

Achieving a truly comprehensive watershed approach requires a very significant, long-term commitment to a resource-intensive process, complete with a wide range of skills and experience. Comprehensive watershed planning carried out solely by a team of hydrologists is no longer adequate or appropriate. A comprehensive watershed approach requires a team that includes individuals skilled and trained in not only hydrology, but also in geology, biology, socio-economics, public policy, agriculture, and energy. Furthermore, one cannot study the water in our nation's streams and rivers without seeking to understand how it interacts with underlying aquifers. Facilitation is also a key, but often overlooked, part of the process. But, I'm putting the cart before the horse.

One of the most important aspects of water planning recognized by the Texas Legislature and the Governor was the need for data and the tools and

technologies needed to interpret the data. Data is the foundation on which all steps in any planning process rests. In my testimony before this subcommittee back in November of 2007, I discussed the importance of accurate, timely data. Since 1997, Texas has invested approximately $36 million in the regional water planning process and another $20 million to collect and analyze basic surface and groundwater data. This data allows us to calculate current supplies and make projections for the availability of future supplies to meet needs over the next 50 years.

Comprehensive watershed planning cannot be conducted in a vacuum. Data needs are enormous. In addition, as the gap between water supplies and demands for those supplies narrows, more and better data is needed to ensure that we maintain the often delicate balance between economic growth and environmental protection and sustainability. Local and regional planners, who will also be the project sponsors, understandably insist upon having adequate and reliable water data on which to base their policy recommendations and funding decisions. Thus, the dearth of data can be a potential obstacle for truly comprehensive watershed planning in many parts of the country. I have had the privilege of sharing and working with numerous states throughout the country on the Texas planning model (from California to Pennsylvania and several states in between) and concluded that few if any of these states possess the volume and quality of data, both temporal and spatial, necessary to build a credible water supply plan, let alone create comprehensive plans in a watershed to account for the multitude of uses and users. Even where adequate data exists, there has yet to be adequate modeling tools developed to facilitate 21st century-appropriate comprehensive watershed planning.

In Texas, one of the key results of the implementation of Senate Bill 1 was the development of surface and groundwater availability models. Surface water availability models for all 23 major and coastal river basins and groundwater availability models for 9 major and almost all of the 21 minor aquifers in Texas now exist and are available for public use. The water availability models are used for planning and regulatory purposes, ensuring some synergy and communication not only between responsible state agencies, but also with project sponsors and other interested stakeholders.

Effective and efficient data sharing reduces duplication of effort and, at the same time, helps us to identify data gaps. Recent technological developments have enabled data sharing like never before. National initiatives such as the Consortium of Universities for Advancement of Hydrologic Science Inc., Hydrologic Information System (CUAHSI HIS) are enabling local, state and federal agencies as well as consultants and universities to make their data available to a broad community of interested users through Web-based data portals.

Significant technological improvements in streamflow monitoring have been made in recent years. Although the total number of water monitoring stations is

slightly lower now than in past years, the number of stations across the country for which real-time water resources monitoring data are available is significantly higher, which has been of benefit to water users, water managers and the general public. Furthermore, data quality has improved as a result of more accurate equipment and the ability to identify faults in a timelier manner. Unfortunately, the National Streamflow Information Program and Cooperative Water Program, both administered by the U.S. Geological Survey, remain significantly underfunded. Adequate funding for both of these programs will be necessary before we can start developing truly comprehensive watershed plans.

In addition to gathering sound scientific data, another key component of comprehensive watershed planning is the deliberate effort to gather the numerous voices into facilitated discussions. Again, I'll use the Texas experience to depict the looming challenge ahead.

For the 2007 State Water Plan, the 16 planning groups composed of approximately 350 voluntary representatives with a broad array of interests, including the 11 interest group categories specifically required by statute. They worked for more than four years to develop their regional water supply plans and held several hundred public meetings across the state to solicit public input. Planning group members spent thousands of hours and traveled as many miles to create these plans.

Throughout each planning process, joint meetings between the planning groups serve both to coordinate water supply management strategies and also to circumvent future potential conflicts arising over the use of shared resources. When appropriate, planning groups coordinate their planning efforts with those of neighboring states and the Republic of Mexico. Because certain water management strategies, such as the development of a large reservoir, could satisfy needs in more than one region, the planning groups are encouraged to form subregional water planning groups and to hold joint regional meetings.

As I've described, Texas has gained valuable insight into the critical components of watershed planning as it relates to water supply. We have also learned through this process, however, that it is extremely challenging to incorporate into our water supply planning the associated impacts related to water quality and the environment.

So please keep in mind that I have just described the Texas process for water supply planning. Now multiply this effort by an order of magnitude to get a sense of the effort involved in comprehensive watershed planning. The resources, time, coordination and facilitation required for the type of effort described as comprehensive watershed planning is considerable if not overwhelming.

EFFORTS AT THE FEDERAL LEVEL

It has been the Texas experience that we are not yet ready for truly comprehensive watershed planning at the federal level. Numerous discussions

have taken place, entire conferences have been held around this very issue, and as I mentioned, there has been almost universal agreement that comprehensive watershed planning is the next great plateau to attain if we are going to be successful in meeting the almost infinite myriad of challenges facing our nation in the 21st century. This is especially true when we consider the yet to be realized potential impacts of climate variability on our watersheds. At this point, however, we are holding a nice cover that promises more than the book delivers. We need to get past the rhetoric and begin to take action. Madame Chair's call and the subcommittee's consideration of this issue today will provide the impetus for an action plan.

At the risk of being repetitive, I will suggest to Congress that the very first step to be taken to improve federal support of water resources planning and management is to convene a forum to discuss the appropriate role of the federal government in this regard. Numerous federal agencies have a stake in the game, but there appears to be very little coordination amongst them, resulting in gaps, duplication, and even conflicts in approach and conclusions.

Let me be clear that I say this with some trepidation, as the members of the subcommittee are keenly aware of the states' unflinching stance on state primacy over water resources. Yet, the piecemeal approach cobbled together by various federal agencies hinders our ability to fully use federal assistance and support on water resources issues. This is especially true when one considers the significant federal legislation, such as the Endangered Species Act, the Safe Drinking Water Act, and the Clean Water Act, that local sponsors will be required to address as they formulate and develop comprehensive watershed plans.

I appreciate the opportunity to offer insights on Comprehensive Watershed Management and Planning. I hope I have been able to provide to the subcommittee a better understanding of the challenges ahead. Comprehensive watershed planning is a worthy goal, but we need to be clear on the enormous challenges, including fundamental structural changes, that we will need to address before we can be confident that a collaborative and comprehensive approach is achievable. I am available for your questions.

Thank you.

The Nature Conservancy
Protecting nature. Preserving life.™

Worldwide Office
4245 North Fairfax Drive
Suite 100
Arlington, Virginia 22203-1606

TEL 703 841-5300
FAX 703 841-1283
nature.org

Statement of Brian Richter
Co-Director, Global Freshwater Team
Before the Subcommittee on Water Resources and the Environment,
Committee on Transportation and Infrastructure
May 24, 2008

Madame Chairwoman and members of the Subcommittee, thank you for the opportunity to testify on comprehensive water management and watershed planning. I am Brian Richter, co-director of The Nature Conservancy's Global Freshwater Team. My comments today will focus on four areas:

- A natural process-based approach to watershed management
- Comprehensive watershed planning
- Comprehensive management of dams and reservoirs across watersheds
- Watershed-based authorizations

The Nature Conservancy is an international, nonprofit organization dedicated to the conservation of biological diversity. Our mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Our on-the-ground conservation work is carried out in all 50 states and in 30 foreign countries and is supported by approximately one million individual members. The Nature Conservancy has protected more than 117 million acres of land and 5,000 miles of river around the world. Our work also includes more than 100 marine conservation projects in 21 countries and 22 US states.

The Conservancy owns and manages approximately 1,400 preserves throughout the United States—the largest private system of nature sanctuaries in the world. We recognize, however, that our mission cannot be achieved by core protected areas alone. Therefore, our projects increasingly seek to accommodate compatible human uses, and especially in the developing world, to address sustained human well-being.

As the Conservancy has increased its engagement in a variety of restoration projects ranging from large-scale efforts in the Upper Mississippi River and Everglades to smaller scale projects under continuing authority programs, the Corps has become an important conservation partner. By number of projects, the Conservancy is the Corps' largest non-federal sponsor of ecosystem restoration projects. This expanding partnership is reflected in our Sustainable Rivers Project, a joint effort focusing on dam re-operations in 8 ecologically significant river systems across the country. At another 39 sites we are collaborating with the Corps under the sections 1135 and 206 Continuing Authority Programs (CAPs), and other Corps authorities, to protect and restore areas of critical ecological concern. The suggestions offered in the testimony today draw extensively on our on-the-ground experience of working with the Corps to restore aquatic ecosystems.

I. Watershed Process-Based approach

The idea of a "watershed approach" is becoming more common in the planning and construction of water resource projects. Many Corps districts are already using a conceptual "watershed approach." However, the term watershed approach is poorly defined and does not yet provide detailed guidance for the planning, selection and design of projects. The Conservancy believes the key components of this term and approach need to be better defined and elucidated.

Currently, a watershed approach used when planning a project may involve consideration of a watershed's geographic boundary, but project selection and design rarely accounts for the cumulative impacts on a river's physical processes. This narrow approach to water resource planning even if it is conducted on a watershed scale ignores many of the important natural processes of rivers that link water resource projects in a given watershed. Therefore, if our water resource projects and management activities are going to comprehensively meet multiple needs, such as flood risk management, navigation and ecosystem restoration, the Corps must take a *watershed-process based approach* that treats rivers and watersheds as integrated systems. Such an approach recognizes and accounts for factors such as hydrologic connectivity, role of functioning floodplains, channel evolution and sediment movement along the river corridor as the basis for planning and implementing projects.

A watershed-process based approach also fully incorporates the role of healthy and functioning ecosystems into watershed planning. By narrowly focusing on single project purposes (e.g. flood risk reduction), the current planning process often ignores the services provided by ecosystems (e.g., the flood storage capacity of functioning floodplains). As we become more aware of the ecological impacts of water resource development as well as the benefits that healthy ecosystems provide, it is important to ensure that planning and project selection incorporate a comprehensive analysis of watershed needs, including accounting for the contribution that functioning ecosystems provide.

Use of a watershed-process based approach can bring valuable insight into the planning and design process. For example, often a condition that is seen as a cause of a water resource challenge (e.g., sedimentation) is actually a symptom of a larger watershed process issue (e.g., channel adjustment related to changes in flow regime). Therefore, an understanding of riverine processes should be integral to selecting the appropriate design approach and will result in projects that better accommodate for the natural processes that will inevitably affect all projects and activities within a watershed. A watershed process-based approach that considers factors such as how a project will affect the downstream system, is a result of upstream management actions, and is impacted by land use in the watershed, would be a critical improvement to the current project planning process.

II. Comprehensive Watershed Planning

It is important that our watershed planning efforts place multiple water resource projects and objectives into a broader strategic context than is possible within the confines of the

traditional water resource planning process which focuses on the planning of individual projects from reconnaissance to final design. Instead of planning individual projects from beginning to end, Corps planning efforts should more frequently seek to develop and utilize watershed-based tools that allow the Corps and key stakeholders make critical decisions about water resource management before proceeding to the design of individual projects. Unlike a static study for a single project, watershed-based tools can have the advantage of being dynamic, considering riverine processes, incorporating human and ecosystem goals, and guiding decision-making across entire watersheds.

One example of such a tool is a computer decision-support system being developed for the **Upper Delaware River Watershed**. Here, the Conservancy and the Corps are working to develop an innovative spatially explicit decision support tool that will collaboratively evaluate the impact and viability of potential floodplain/flood storage projects at multiple geographic scales (e.g. site, river reach, watershed). Known as the **Floodplain Reconnection Decision Support System**, this tool is a user-friendly graphical, decision support tool that will allow state and federal agencies as well as stakeholders to model key physical and biological variables, built infrastructure, and hydrologic parameters across the watershed. This information will then be used to model the effectiveness of various strategies (e.g., floodplain reconnection, wetland restoration, levees, and structural elevation) in reducing flood heights in the basin.

Comprehensive tools that can be used to solve water resources issues in a watershed, such as the Floodplain Reconnection Decision Support System just described, are much more useful and result in better project outcomes than individual project based studies which can result in sub-optimal outcomes. In the Delaware Basin the tool being developed will be an improvement over the current ad hoc approach, which has resulted in a series of projects to address flooding and floodplain reconnection that do not necessarily work together to reduce flood risk across the basin because they do not take into account the cumulative impacts and interrelatedness of projects in the watershed.

While the Delaware River example is a model that should be implemented and replicated, we recognize that computer-based decision-support tools are not financially viable or practical in every situation. A related mechanism is the Corps' Comprehensive Watershed Study, which can often achieve similar outcomes to a decision-support tool if the goals of the study are clearly articulated and the study is a partnership-based effort with stakeholder buy-in.

The **Yellowstone River Corridor Comprehensive study** is a good example of an outcome focused Comprehensive Study effort that will provide very useful information for the future management of the river. The goal of the study is to quantify and describe cumulative effects of irrigation projects and riparian degradation on the health of the river and to develop a series of conservation-based management practices along the river's main stem to ensure the survival of endangered fish species and the river valley's characteristic gallery forest system. The critical components that make this a successful effort are that the outcomes of the study are clearly articulated (i.e., restoring endangered fish and riparian habitat) and that the study is being conducted in partnership with a broad

array of stakeholders, including multiple conservation districts along the river, NGOs, state agencies and other federal agencies. Broad buy in to the goals of the study and the subsequent recommendations greatly increase the likelihood that the study will become an important tool for guiding decision-making on the river.

Drawing on our experience in both the Delaware and Yellowstone River basins, the Conservancy believes the focus of water resource planning efforts should be less on static, single-project studies and more on outcome-oriented decision-support tools that take into account watershed-wide processes. To be useful, these products should not only describe current watershed conditions but also adequately incorporate river processes and clearly articulate outcomes up front so that they can serve as a decision-support tool for future watershed projects and management activities.

III. Comprehensively Managing Reservoirs Across Watersheds

A comprehensive approach to the management of dams and reservoirs affords the opportunity to optimize water resource decisions in a way that can't be done when focused solely on a single project or a subset of watershed needs (e.g. purely flood control, water supply, or recreation). By comprehensively analyzing operations on a watershed basis we can move beyond incremental improvements at a single facility to significant changes across entire basins that meet multiple water resource goals.

The benefits of this approach to infrastructure management is illustrated by our efforts on the **Penobscot River in Maine**. The Conservancy is a partner in the Penobscot River restoration project, which seeks to restore hundreds of miles of spawning habitat for endangered Atlantic salmon and numerous other diadromous fish species. In an innovative relationship between the PPL Corporation and the Penobscot River Restoration Trust, three hydropower dams on the mainstem river will be removed, state-of-the-art fish passage will be installed around a fourth, and hydropower production will be increased at other facilities on river tributaries. The result will be one of the largest river and migratory fish restoration efforts in the history of the Eastern United States with essentially no loss to net hydropower production in the basin. By upgrading power production to other areas in the Penobscot Basin area and opening up over 1600 km of additional habitat, the project found ways to maintain hydropower across the system in a way that minimized ecological destruction. Such an outcome was only possible because the project partners were able to take a multi-dam, basin-wide perspective when evaluating future hydropower and ecosystem needs on the river.

Similarly, the Conservancy and the Corps have been working together since 2001 under the Sustainable Rivers Project to improve management of Corps dams. The operating procedures for the hundreds of dams that the Corps owns and operates often seek to optimize inexpensive water supply, power, and flood control, but have largely ignored ecosystem needs downstream of these facilities. Our work with the Corps to date through the Sustainable Rivers Project has already demonstrated at several sites that modest adjustments to existing dam operations to accommodate for a broader array of watershed needs can yield substantial improvements in ecosystem health. These improvements have been achieved while only minimally affecting primary dam functions and keeping

operational changes within the project's authorized purposes. In fact, our work on the **Green River in Kentucky** to comprehensively consider multiple needs in a watershed (e.g. flood control, recreation, *and* ecosystem health) has resulted in some changes in reservoir operations that are not only better for downstream ecosystems, but they also have improved performance for original project purposes such as flood control and recreation.

On the **Willamette River in Oregon**, another Sustainable Rivers Project site, the efforts of the Conservancy and the Corps also illustrate the potential for managing infrastructure systematically and comprehensively to improve ecosystem conditions while still meeting flood control needs. The Corps operates 13 dams on tributaries in the Willamette basin with flood damage reduction as the primary purpose of this system of dams. Unfortunately, operation of the dams has changed the volume and timing of river flow, resulting in the decline of native fish populations, including seven species that are now listed as federally threatened or endangered. Starting on two tributaries that contain 6 of the 13 dams, the Corps and the Conservancy are working cooperatively to quantify environmental flow needs and examine how flow recommendations can be implemented while still meeting the dams' primary purpose of flood control.

Because the dams are operated as a system, there is a relatively high degree of operational flexibility, allowing the Corps to use multiple fill and release combinations to meet the flood control objectives for the river. The initial work to understand ecosystem needs of two of the basin's tributaries lays the foundation for a comprehensive management of the entire system in a manner that improves ecosystem health without diminishing flood risk reduction efforts. The systematic management of these reservoirs offers great potential for comprehensively managing the river to meet multiple water resource goals. We believe that a comprehensive approach that manages the reservoirs for multiple purposes should be implemented on the Willamette and replicated elsewhere in the country.

Another key component of comprehensive management of water resources infrastructure is better accounting for the role of functioning floodplain ecosystems in meeting flood risk reduction goals within a watershed. We must integrate the role of healthy and functioning floodplains and wetlands into our flood management and not rely solely on dams and reservoirs to meet these needs, particularly as hydrological changes associated with climate change makes the other purposes of these reservoirs even more important.

By taking a comprehensive approach to water management and reducing our reliance on dams to provide flood control we can improve use of existing reservoir storage while benefiting ecosystem health. Presently, a tremendous volume of potential storage space is left empty behind dams because that space is reserved to capture incoming floods and protect downstream structures and roads. If those downstream structures could be moved out of harm's way, and if natural floodplain areas could be restored for the purpose of storing floodwaters, the immense volume of usually-empty flood storage in our nation's reservoirs presently being reserved for flood control can be converted into storing water to supply cities and farms, generating hydro-electric power, and releasing improved

environmental flows into downstream ecosystems. Moreover, floods that are allowed to return to their natural floodplains recharge underlying aquifers, which slowly release groundwater back to the river as cool, steady baseflows. Additionally, restoring natural floodplain areas will greatly benefit many plants and animals that have become endangered due to excessive floodplain development.

Through our work on the **Yangtze River in China**, we have developed a proposal – now under serious consideration by the central Chinese government – that calls for large-scale restoration of the Yangtze valley's floodplain and illustrates the potential benefits of using floodplains instead of dams for flood management. This proposal would enable the flood control volume planned for the new reservoirs on the Yangtze to be reduced substantially and would instead use the available reservoir volume to produce much more hydropower from the Yangtze dams. In fact, we estimate that as much as $1 billion per year of additional revenue could be generated from increased electricity production on the Yangtze River, which in turn would be used to fund floodplain restoration and other non-structural forms of flood management. It will also enable the Chinese to produce badly-needed electricity in a relatively clean manner that does not exacerbate climate change.

To replicate projects in the Penobscot and Yangtze Rivers as well as efforts though the Sustainable Rivers Project and to ensure a more efficient and watershed-based method of infrastructure management, we must invest in the research to allow us to gain a better understanding of where there are opportunities to alter reservoir operations to meet broader watershed goals. In particular, this research should include a national assessment to identify locations at which the operating purposes of flood control dams can be modified by shifting flood management to floodplains, by removing or re-locating roads and structures or by removing, or setting back levees that constrain floodplain areas. Undertaking a national effort to analyze the operation of our infrastructure in a watershed context could help to restore thousands of impaired river miles across the country while increasing the reservoirs' operational flexibility and resiliency to future demands and climatic changes.

IV. Regional Authorizations

If we are to move towards a comprehensive watershed-based model for management of our water resources and utilize the innovative watershed-based planning and decision support tools described above, we must examine how water resource projects are authorized and funded. With limited Federal dollars and extensive water resource needs, no longer can we settle for an isolated project by project approach, which the current authorization and appropriation process drives the Corps towards. Instead, we must invest in comprehensive watershed planning efforts to first determine how multiple needs in a watershed, river basin or coastal area can be met and then build on these plans by creating regional and watershed authorities that allow for implementation of projects that comprehensively meet water resource goals.

There are already successful authorities to draw on in developing regional approaches to water resource development. For example, the **Navigation and Ecosystem**

Sustainability Program for the Upper Mississippi River seeks to restore the Mississippi River while providing for navigation system improvements. The Navigation and Ecosystem Sustainability Program (NESP) as authorized under the Upper Mississippi River and Illinois Waterway system in WRDA 2007 is a long-term (50-year), dual purpose program of navigation improvements and ecological restoration that will engage a broad array of federal agencies, industry and non-governmental stakeholders to ensure the economic and environmental sustainability of the Upper Mississippi River System. NESP is the first dual purpose authority that brings together both navigation and environmental interests across a river basin to create and implement a shared vision. It is a critical addition to the Corps' authority because it allows the Corps to manage the system for two purposes and to evaluate river-wide processes and functions as projects are selected and implemented. Furthermore, the process for identifying and selecting projects is built on a strong foundation of scientific input and stakeholder involvement.

Another example of a comprehensive approach that has the potential to be leveraged into a comprehensive watershed-wide effort is the **Hamilton City Flood Damage Reduction and Ecosystem Restoration project in California**. Hamilton City is located on the Sacramento River--the largest river in California, draining approximately 24,000 square miles and supplying 80 percent of the freshwater flowing into the Sacramento-San Joaquin Delta. Historically, the river was lined by 800,000 acres of riparian habitat. Over 95 percent of this habitat has been lost.

Hamilton City and surrounding agricultural lands are only marginally protected from flooding by a degraded private levee (circa 1904) called the "J" Levee. The "J" Levee does not meet any formal engineering standards and provides only a 66 percent chance of passing a 10-year flood. As a result, Hamilton City has mounted flood fights and has been evacuated due to flooding six times in the last 20 years. After 25 years of unsuccessful efforts to secure federal engagement in their efforts to reduce the risk of flooding, project partners, including the city, the Conservancy, and the state of California, collaborated to develop a project that would both reduce the town's flood risk and restore the river floodplain by constructing a new set-back levee and reconnecting 1,500 acres of floodplain to the river.

This dual purpose project has the potential to be a true "win-win"--by meeting the flood-control needs of the local community while restoring riparian habitats and natural river processes. Furthermore, replicating this project elsewhere in the Sacramento river watershed offers an innovative solution to meeting complex flood risk reduction issues in the basin while restoring critical natural resources. Unfortunately, the project has run into multiple hurdles because it does not fit into the traditional single-purpose project model, making replicating multiple projects of the same nature across the watershed nearly impossible. For projects like Hamilton City to become the norm instead of the exception, the Corps would benefit from watershed-based authorities enabling them to more easily implement non-traditional projects that truly meet multiple water resource goals.

To maximize our investment in water resources development by taking a comprehensive approach to water management, replicating regional planning and project implementation efforts like the ones described above will be critical. The authorization and appropriation process should seek to encourage these approaches by creating regional or watershed-based authorities that are focused on comprehensively addressing water resource issues. Activities authorized should be informed by sound science, engage appropriate stakeholders, and seek to achieve multiple water resource goals.

V. Conclusion

Utilizing a watershed-process based approach and comprehensively managing water resources for multiple goals can have enormous benefits. Evaluating operational flexibility of dams and reservoirs to incorporate a broader array of water resource goals results in more efficient management of this infrastructure and improves their resiliency and flexibility to meet future needs. A watershed-process based approach also maximizes the federal investment in water resource projects by increasing the understanding of how projects in a watershed relate to one another and how limited federal dollars can be spent most efficiently to meet multiple goals. Moreover, by improving the planning process for water resource projects and updating authorizations and appropriations to reflect watershed-based decision-making, we can go a long way towards providing for human safety, navigation, water supply and recreation while maintaining and restoring the country's aquatic ecosystems.

Thank you for the opportunity to present this testimony today. I would be happy to answer any questions you may have.

The Nature Conservancy
Protecting nature. Preserving life.™

Worldwide Office
4245 North Fairfax Drive
Suite 100
Arlington, Virginia 22203-1606

TEL 703 841-5300
FAX 703 841-1283
nature.org

Mr. Michael Brain
Subcommittee on Water Resources and the Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
B-376 Rayburn House Office Building
Washington, DC 20515

RE: Written responses for the record

Mr. Brain,

Please find enclosed Brian Richter's response to the request for more information related to his testimony at the hearing on Comprehensive Watershed Management and Planning. Mr. Richter's written response for the record is enclosed.

Please don't hesitate to contact me if you have any questions.

Regards,

Jason Albritton
Senior Policy Advisor for Water Resources

Enclosures

Q: As I reflect on your testimony, I would like to ask you to submit for the record further elaboration on what elements you think need to be included for a useful, comprehensive watershed planning process. Also, please consider some of the existing federal agency authorities that exist and what modifications might be needed to allow those existing authorities to operate in a more meaningful fashion.

A: Mister Chairman, thank you for the opportunity to further explain my ideas on how to undertake watershed planning and management.

To provide information that can support decision-making, watershed planning should seek to describe and analyze multiple issues within a watershed and result in a product that allows decision-makers to most efficiently balance competing demands on limited water resources and to develop strategies which can simultaneously achieve multiple public purposes.

Accordingly, watershed planning should not focus on single issues or purposes (e.g., flood risk reduction). Instead, watershed planning should evaluate multiple issues collectively and seek to identify efficiencies in the management of both natural and fiscal resources that are not possible when planning for a single purpose (e.g., dredged sediment can be used for ecosystem restoration if a comprehensive plan for sediment needs in the watershed has been completed).

The most important criteria for watershed planning is that it must account for natural processes as the basis for planning and implementing projects. Examples of natural processes that should be considered include hydrologic connectivity, role of functioning floodplains and coastal habitats, channel evolution, and sediment movement along the river corridor or coastal area. These factors will influence all types of water resource projects, ranging from flood risk reduction to navigation to ecosystem restoration. An understanding of these natural river and coastal processes and how an individual project affects these processes and, as a result, affects other projects within the watershed or coastal area, will help public officials evaluate trade offs and maximize efficiencies. For example, floodplain restoration can be a key strategy for meeting both flood risk reduction and ecosystem restoration goals in a watershed. By understanding natural river processes, such as river-floodplain interaction, and seeking to identify projects that accommodate for these natural processes, efficiencies are gained, costs are reduced, and multiple goals can be met with a single water resource project.

While comprehensive watershed plans are a useful tool for improving decision-making in a watershed or coastal area, it is important to note that not every new watershed plan needs to be started from scratch. Often, there is extensive planning and data that has already been completed in a given geographic area. Therefore, watershed planning efforts should seek to first identify available data and existing plans, and build from these instead of starting the planning process from square one. By building on existing plans, the costs of developing watershed plans can be significantly reduced.

The Corps of Engineers currently has a number of authorities that allow for watershed based planning. Section 729, Watershed and River Basin Assessments, as included in WRDA 1986 and modified in WRDA 2000 and 2007, provides authority for the Corps to conduct watershed

planning. Furthermore, there are a number of individually authorized Comprehensive Study authorities that allow the Corps to work on a watershed basis.

These authorities are a good start for developing watershed plans. However, several improvements are needed to ensure that watershed planning efforts will result in meaningful outcomes in a timely and cost-effective manner.

Prevent reinvention of the wheel: One shortcoming of current authorities is that they do not explicitly allow for the use of existing data and plans, particularly those provided by non-governmental entities. As mentioned, use of existing data and plans is important so that new watershed planning efforts are not duplicative and do not cost more than necessary.

Facilitate implementation of good plans: Another significant shortcoming of current watershed planning authorities is that these planning-only authorities are not specifically linked to project implementation or construction. With the exception of the national continuing authority programs and a few regional authorities, construction of each water resource project is individually authorized and there is no requirement that individually authorized projects are consistent with a watershed plan. As a result, there is no incentive on the part of the non-federal sponsor or the Corps to use watershed planning to guide the prioritization, design and construction of water resource projects. This disconnect can render watershed planning efforts futile, and may result in projects that are suboptimal or even inappropriate for a given watershed. For even the best watershed plans to be useful, those plans must influence the prioritization of investments and design of new infrastructure to ensure that such investments facilitate optimal management of key resources in the watershed.

To remedy the shortcoming in current authorities, the Committee should:

1. Authorize use of existing data: The Section 729 authority and other relevant individual authorities should be updated to ensure that watershed or river basin assessments and plans incorporate existing hydrological data and plans.

2. Create new, watershed-based regional authorities: The Committee should seek to create additional, strategically valuable, regional continuing authority programs that allow for both planning and construction of projects in a given watershed or coastal areas. These regional authorities would allow the Corps to work with stakeholders to conduct up front watershed planning or evaluate existing plans and data and select and implement projects based on this information. For projects that are below a certain size and cost threshold (similar to those limits in place for current continuing authority programs), these regional authorizations should allow the Corps to move forward with design and construction as long as the projects are consistent with the comprehensive watershed or regional plan developed pursuant to the authority.

Regional authorities will allow more comprehensive watershed-based management by linking planning and construction in one authorization. This idea has been tested and implemented on a limited scale through the Puget Sound and Adjacent Waters restoration program, which is a regional continuing authority for restoration of the Puget Sound. Building on the Puget Sound example, regional authorities could be focused more narrowly on specific issues such as

ecosystem restoration or crafted broadly to address multiple water resource needs in a given watershed.

3. Ensure consistency between large projects and watershed plans: We also recognize that not all projects can be authorized through a regional authority due to large costs or complexity that require additional Congressional oversight. For such projects, the Committee should seek to ensure that these individually-authorized projects are consistent with a watershed plan by creating incentives (e.g., reduced cost-shares) for projects that demonstrate consistency with a regional or watershed plan.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

COMPLETE STATEMENT

OF

STEVEN L. STOCKTON, P.E.
DIRECTOR OF CIVIL WORKS
U. S. ARMY CORPS OF ENGINEERS

BEFORE

THE SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES

ON

COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING

June 24, 2008

Introduction

Madam Chair and members of the Subcommittee, I am Steven Stockton, Director of Civil Works, U.S. Army Corps of Engineers. Thank you for the opportunity to testify today on comprehensive watershed management and planning.

I will start my testimony with an overview of the current water resources issues for the Corps today, as I see them, followed by a perspective on the Corps role in integrated water resources management. We collaborate with other agencies and stakeholders and I will provide as examples five watershed studies now underway.

Water Resources Challenges

The water resources problems that the Nation faces are complex. Past, current, and emerging trends that impact water resources include the impacts of droughts, floods, and hurricanes; the migration of people to coastal states; growing urban centers in arid and semi-arid regions, with a need for reliable, sustainable water supply; urban development in river valleys and its impact on floodplains; aging infrastructure, sometimes breaking down or not performing as designed; the effects of climate change, which are difficult to pinpoint; sedimentation in multipurpose reservoirs used for flood or water storage; and water conflicts between states, which become most apparent when shared water resources diminish such as under long-term drought conditions. These and other similar challenges require coordinated and collaborative approaches.

Water resources planning and management requires an appreciation of the existing and potential future uses of the water resources. States and other resource agencies are growing in their engineering and water resources capabilities and many are showing much greater interest in being directly involved and even in leading water resources management opportunities. Where the Federal government has an interest in the water resources, water management is generally not the sole responsibility of either the States or the federal government but is rather a shared responsibility. Both the federal government and the States can benefit from this shared responsibility, and the Corps of Engineers is working to play a constructive role in these partnerships.

We are technical experts in water resources management, water policy, regulatory permits, and hazard response. Those roles are changing somewhat as the level of capability within more and more States and other organizations and their interest in assuming a larger role in water resource management increases. The Corps has, in its planning and engineering capability, the experience and knowledge to develop enduring water resources solutions, utilizing adaptive management, collaborative processes, and systems planning. These skills position the Corps as a partner in identifying problems, needs, opportunities, and potential shared solutions that are implementable within a watershed.

Corps Role in Watersheds

Historically, the Corps flood damage reduction and emergency response efforts have been watershed based. Since the great Mississippi River flood in 1927, the Corps has been building and maintaining a large system of levees and related features to reduce flood damage in the alluvial valley of the lower Mississippi River. This and our later effort to reduce flood damage along the Missouri River by building six large main stem dams were based in watershed planning.

For a number of reasons, the civil works construction program has become more focused on specific locally-based projects in recent years. The era of large multipurpose dams has come to a close in this country. The cost-sharing requirements of the Water Resources Development Act of 1986 may also have contributed to this trend. Our sponsors have limited budgets and are often interested in minimizing their costs to achieve a solution to a specific water resources problem. Watershed studies are more challenging to arrange because they involve multiple sponsors, and require compatible interests and aligned budgets.

Nevertheless, we have undertaken a number of watershed studies since WRDA 1986. For example, the recent Illinois River Basin Restoration study covered 30,000 square miles in Illinois, Indiana and Wisconsin. The large geographic scale, numerous stakeholders, close teamwork, excellent communications, innovation, and commitment to collaboration earned its selection as the winner of the 2007 Environmental Planning Excellence Award of the American Planning Association. Our efforts to manage water on a large geographic scale have also led to three major Corps aquatic ecosystem restoration programs – in the Everglades, in the coastal wetlands ecosystem of Louisiana, and in and along the Upper Mississippi River and the Illinois Waterway.

Nonetheless, the cumulative effect of small-scale decision making over the last two decades has become more apparent in recent times. There is now a general recognition of the need for more holistic, comprehensive analysis by water resources practitioners at all levels of government.

The Energy and Water Development Appropriations Act of 2006 (PL 109-103) included $4.5 million for comprehensive analyses to examine multi-jurisdictional use and management of water resources on a watershed or regional scale, at full federal expense. The Corps used these funds for five studies from across the Nation. These two-year studies, which are nearing completion later this year, have helped bring stakeholder groups together, in many cases for the first time, to discuss water resource problems. The studies selected were:

1. Great Lakes Habitat Initiative;
2. Multi-jurisdictional Use and Management of Water Resources for the Delaware River Basin, NY, PA, NJ and DE;
3. Western States Watershed Study - Comprehensive Water Resource Planning for the 17 Western States;
4. Middle Mississippi River Regional Corridor; and
5. Virgin River Watershed Analysis Utah, Arizona and Nevada.

Each study is unique. They are resulting in important products, including tools to facilitate stakeholder involvement; database creation and development; development of regional strategies for restoration of water resources within a river corridor; the creation of plans to manage water resources around key issues such as flood plain management, water supply, and endangered species; and implementation of advance flood warning systems, as well as evacuation and flood risk communication plans. As these studies come to completion, I fully expect for us to see lessons learned and I look forward to sharing those with you at a later date.

A main observation is that collaboration is working! Partnerships with states and other resource agencies have helped to achieve better coordination. The Corps involvement provided tools and databases, collection and sharing of data, and engineering, scientific and environmental expertise to assist watershed planning."

Another observation is that the Federal government can be a successful team member in watershed efforts. The interactions with state and local officials, non-governmental organizations, and private interests can encourage a common language, making it easier to connect programs and projects within the watershed. Large-scale studies require the active involvement of a broad range of partners over time, including other participating Federal agencies. Each Federal agency brings a different programmatic emphasis. Such collaboration can improve the prospects for success at state, regional and local levels.

Assisting States in Watershed Efforts

Our Planning Assistance to States program, authorized in section 22 of WRDA 1974, provides planning and technical assistance for a wide variety of activities, including locally-led water resources plans. Similarly, under the Floodplain Management Service Program, authorized in section 206 of WRDA 1960, the Corps supports local efforts to reduce the risk of flood damage by planning in a watershed context.

Section 729 of WRDA 1986 authorized the Corps to assess water resource needs of river basins and watersheds. Section 2010 of WRDA 2007 increased the Federal share for this program to 75 percent and reduced the non-Federal share to 25 percent. We also have numerous technical assistance authorities for specific watersheds. For example, section 5119 of WRDA 2007 authorized assistance to help Oklahoma update its state water plan.

In addition, the Corps regulatory program is taking steps to make decisions in a broader context using GIS-based information, and our flood damage reduction program is working with FEMA to update floodplain maps that can be shared with states.

Looking to the Future

You may ask what else the Corps needs or can do to contribute to watershed analyses.

As previously noted, the Corps has the authorities that we need to allow us to provide planning and technical assistance to support locally-led water resources and floodplain management planning efforts. The Corps has significant technical expertise to offer. For example, we can

assist States to build technically sound watershed-based planning and management programs, which more holistically and sustainably help them to achieve their objectives. We are assessing what the States are doing to promote integrated water resources planning. The assessment will clarify the water resources capabilities of States. From this assessment and through a series of regional conferences, we may be able better to establish priorities for our planning assistance and floodplain management services programs.

The Corps role in the water resources community is evolving. In some cases, we are the lead. In others, we are a contributor or a facilitator. This is partly due to a change in the role of the States and local agencies. They are initiating more water resource planning efforts and projects on their own, and are approaching the Corps to assist on a technical level. Such partnerships can lead to more effective management of state and local water resources. However, their maturity and sophistication can vary significantly in their management and technical capability.

The evolution toward greater interest in collaboration is driven in part by the competition among uses in some watersheds, the evidence of cumulative impacts of multiple projects within others, the increased voice of stakeholder groups, and the growing interest in nonstructural and other management-based solutions.

Through such partnerships, we are providing expertise to help improve the effectiveness of watershed efforts. The Corps has and continues to reach out to other Federal agencies and non-government organizations, participate in development of shared visions on water resource needs and challenges, and support other agencies and stakeholders, with the objective of managing the Nation's water resources in a more sustainable way.

Summary

The interest in integrated water resources analysis, management and planning for current and future water needs and discussions about the appropriate role of the Corps have increased with the growing pressures on the Nation's water resources. As Brigadier General Joseph Schroedel of the South Atlantic Division stated in his testimony to this Subcommittee in March 2008, regarding the drought issues in the Southeast: ***"If any of the agencies - whether federal or state, industry or the public - are to successfully manage water, we must find a way to work more closely and cooperatively across boundaries, missions and jurisdictions."*** His testimony then and mine today, emphasize the interest at all levels of government in a more integrated approach to develop and sustain water resources for the good of the public, for continued economic development, and for security of the nation. Watershed-based analysis is an important element of modern water resources planning and can lead to sound, lasting solutions.

The Corps stands ready to work as a partner with State and local leaders by providing technical expertise, science and data to advance locally-led planning and other watershed efforts. Madam Chair, Members of the Subcommittee, thank you for this opportunity to testify before you. This concludes my testimony. I would be glad to answer any questions you might have.

100

TESTIMONY ON WATERSHED PLANNING

Subcommittee on Water Resources and the Environment
Committee on Transportation and Infrastructure
United States House of Representatives

Provided by:

Mr. Paul O. Swartz
Executive Director
Susquehanna River Basin Commission
Harrisburg, Pennsylvania

July 11, 2008

INTRODUCTION AND OVERVIEW

I am pleased to provide testimony on watershed planning at the request of the Subcommittee on Water Resources and the Environment. As the Executive Director of the Susquehanna River Basin Commission (SRBC), I can attest to the great importance and usefulness of watershed planning in dealing with the many water issues that confront us today and into the future.

Before I discuss watershed planning, I will provide a brief overview of the Susquehanna basin and the SRBC.

The Susquehanna River is the largest river lying entirely in the United States that drains into the Atlantic Ocean. The Susquehanna and its hundreds of tributaries constitute more than 49,000 miles of waterways and drain 27,510 square miles, an area nearly the combined size of Massachusetts, Vermont, Delaware, and New Jersey encompassing parts of New York, Pennsylvania, and Maryland. The river flows 444 miles from its origin at the outlet of Otsego Lake in Cooperstown, New York, until it empties into the Chesapeake Bay at Havre de Grace, Maryland. The river is the largest tributary of the Chesapeake Bay and provides nearly one-half of the freshwater flow to the Bay. The population of the basin was nearly four million people in 2000. Major water resource problems in the basin include flooding, droughts, and poor water quality in some areas. A map of the Susquehanna basin and its major subbasins is attached.

The President of the United States signed the Susquehanna River Basin Compact (Compact) into law (P.L. 91-575) in December 1970, subsequent to its approval by Congress and the prior approval of the states of New York, Pennsylvania, and Maryland. It joined the federal government and the three states as equal partners for a period of 100 years to manage the Susquehanna basin's water resources through proper planning, development, and management of the basin's water resources. The Compact created SRBC as the single administrative agency to develop, effectuate, coordinate, and adopt plans, policies, and programs related to water resources of the basin.

The Susquehanna and Delaware River Basin Commissions are the nation's only two commissions created by federal-interstate compacts. The broad authorities granted to the two commissions provide an ideal basis for comprehensive, coordinated, and efficient watershed planning and management. A 1981 GAO report stated "GAO believes that the commissions (Susquehanna and Delaware) are worthwhile and achieve results – such as management of a basinwide drought – attainable only by joint cooperation and action." This report was entitled *Federal-Interstate Compact Commissions: Useful Mechanism for Planning and Managing River Basin Operations*.

The commissioners for SRBC's three member states are their governors or individuals appointed by them. The U.S. Army Corps of Engineers is designated by law as the federal representative. As Executive Director, I am responsible for the ongoing operations of the SRBC.

SRBC's mission is to enhance public welfare through comprehensive planning, water supply allocation, and management of the water resources of the Susquehanna River Basin. As a

federal-interstate compact body, its jurisdiction is defined by the natural boundaries of the river basin rather than the political boundaries of the member states. SRBC serves as a forum to provide coordinated management, promote communication among its members, avoid conflicts among water users, and resolve water resource issues and controversies within the basin. It has the benefit of viewing issues and solutions from a basin perspective and is not constrained by political boundaries.

The regulatory program administered by SRBC is an important part of its water resource management functions. SRBC is authorized by the Compact to assume responsibility in any matter affecting water resources when a member state is unable to do so. New York, Pennsylvania, and Maryland have different and varying levels of water management regulations. To fill regulatory gaps among its member states, SRBC has adopted regulations for the consumptive use of water and ground and surface water withdrawals. SRBC approval is required for: (1) projects that consumptively use water (water used but not returned to the Susquehanna system) in excess of 20,000 gallons per day over a 30-day average, and (2) withdrawal of ground and surface waters in excess of 100,000 gallons per day over a 30-day average.

WATERSHED PLANNING TODAY

SRBC has a long and successful experience with watershed planning. In fact, the SRBC's *Comprehensive Plan for the Water Resources of the Susquehanna River Basin* includes as its first general principle for water resources management: "Watersheds should be utilized and promoted as the best units for water resources planning and management." The Comprehensive Plan provides an excellent basis for integrated water resource planning on a watershed basis by not only SRBC, but federal and state agencies.

The Plan includes principles, standards, and guidance that are important for good watershed planning. SRBC's annual Water Resources Program (WRP) is the primary implementation vehicle for the Comprehensive Plan and includes input from federal and state agencies on their water resources actions and programs. The WRP provides an opportunity for an integrated approach to implementing water resources actions on a watershed basis.

In recent years, watershed planning principles have been used in a number of SRBC planning efforts to include:

- Groundwater Management Plan for the Susquehanna River Basin (2005)
- Conowingo Pond Management Plan (2006)
- Northern Lancaster County, PA Groundwater Study (2006)
- Consumptive Water Use Mitigation Plan (2008)
- Deer Creek, MD and PA, Water Availability Study (2008)
- Paxton Creek Watershed, PA Stormwater Project (ongoing)

These planning studies had several common features that are needed for successful watershed planning. These include:

- Good data collection and description of baseline conditions
- Clear identification of problems and issues
- Assessment of alternatives, including cumulative beneficial and negative impacts in the watershed
- Selection of the best solution(s) to address issues and problems
- Active participation by and support of stakeholders in the watershed
- Preparation of clear and concise reports

Certainly, there have been successful efforts by other groups, including state and federal agencies, local governments, and watershed associations. A program designed for watershed planning that has not been successful, from SRBC's perspective, was authorized by Section 729 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 202 of WRDA 2000 and Section 2010 of WRDA 2007. The Section 729 authority is entitled "Watershed and River Basin Assessments" and provided authority for the Corps of Engineers to "assess the water resources of river basins and watersheds".

The Susquehanna River Basin was named as a priority watershed. Since 1986, limited federal funding has been provided in FY's 2003, 2004, and 2007 to initiate the Susquehanna basin assessment. Future funding is uncertain at best. SRBC negotiated a scope of work with the Corps of Engineers in 2004 but work could not proceed due to lack of federal funds. Negotiations are ongoing for a revised scope of work with no certainty that the actual work will proceed. The Section 729 program, while promising, has not been productive as a watershed planning tool.

ROLE OF THE FEDERAL GOVERNMENT AND STATES

The federal government and the states play important roles in watershed planning. SRBC has a good working relationship with a number of federal agencies and enjoys the benefits of proactive coordination by the federal member, the Corps of Engineers, with its sister federal agencies. Attached is a table that lists SRBC involvement with various federal agencies. The working relationship between SRBC and federal agencies is enhanced by Federal Coordination Summits held by SRBC in 2005 and planned for November 2008.

The role of a federal agency in watershed planning will vary depending on its specific programs and authorities. However, every agency can and should be applying watershed planning principles such as cumulative effects on water resources and good coordination with stakeholders.

States have a more vested interest and play a larger role in watershed planning, since they deal more directly with local water resource issues. In fact, states frequently have the lead in regional or state-wide efforts. Pennsylvania's Water Resources Planning Act (Act 220 of 2002) and Maryland's Advisory Committee on the Management and Protection of the State's Water Resources (2006) are prime examples of state-led programs that are watershed planning based. SRBC is closely involved with its member states in their watershed planning work.

ISSUES AND POTENTIAL SOLUTIONS

As the last part of my testimony, I have identified several issues to improve watershed planning and potential solutions to address the issues.

Issue No. 1:

Federal programs need to be responsive to watershed planning needs. Many authorities and programs are specifically limited to projects or certain water resource problems (e.g., water quality). Federal agencies should be able to provide support for regional or state-led watershed planning initiatives.

Potential Solutions:

1. Programs that are watershed planning based should be given a priority during preparation of agency budgets and appropriations bills. An example of this is the Corps of Engineers' Section 729 Program.

2. Federal agencies should be given the authority and/or direction, as needed, to provide support for regional or state-led watershed planning initiatives (e.g., watershed planning is not currently an element of the Army Corps of Engineers' official mission).

Issue No. 2:

River basin commissions are leaders in watershed planning and need to continue and enhance this role. Funding sufficient to accomplish these actions is an ongoing and major concern. The federal government discontinued funding for SRBC in the mid-1990's after 25 years of meeting its funding obligation contained in the Compact. Member states have continued their funding of SRBC.

Potential Solution:

SRBC will work to enhance its role in watershed planning and can do so with restored federal funding and continued state funding.

Issue No. 3:

There are many critical water resource issues facing the nation. Consideration should be given to prioritizing funding, providing direction, and setting goals based on needs identified for large watersheds such as the Susquehanna. Three current major issues in the Susquehanna River Basin are discussed below.

3a. Climate change has been tied to an increase in the frequency and severity of heavy precipitation events – raising the likelihood of flooding – and, at the opposite extreme, an increase in the frequency of summer droughts. It is important that the water resource managers know how such changes are expected to affect long-term hydrologic patterns.

Potential Solution:

Federal and state authorities, programs, and policies need to be reviewed and revised, as needed, to address the long-term effects of climate change.

3b. Water supply needs in the basin are growing and more shortages related to droughts and competing uses will occur without proper watershed planning and management.

Potential Solution:

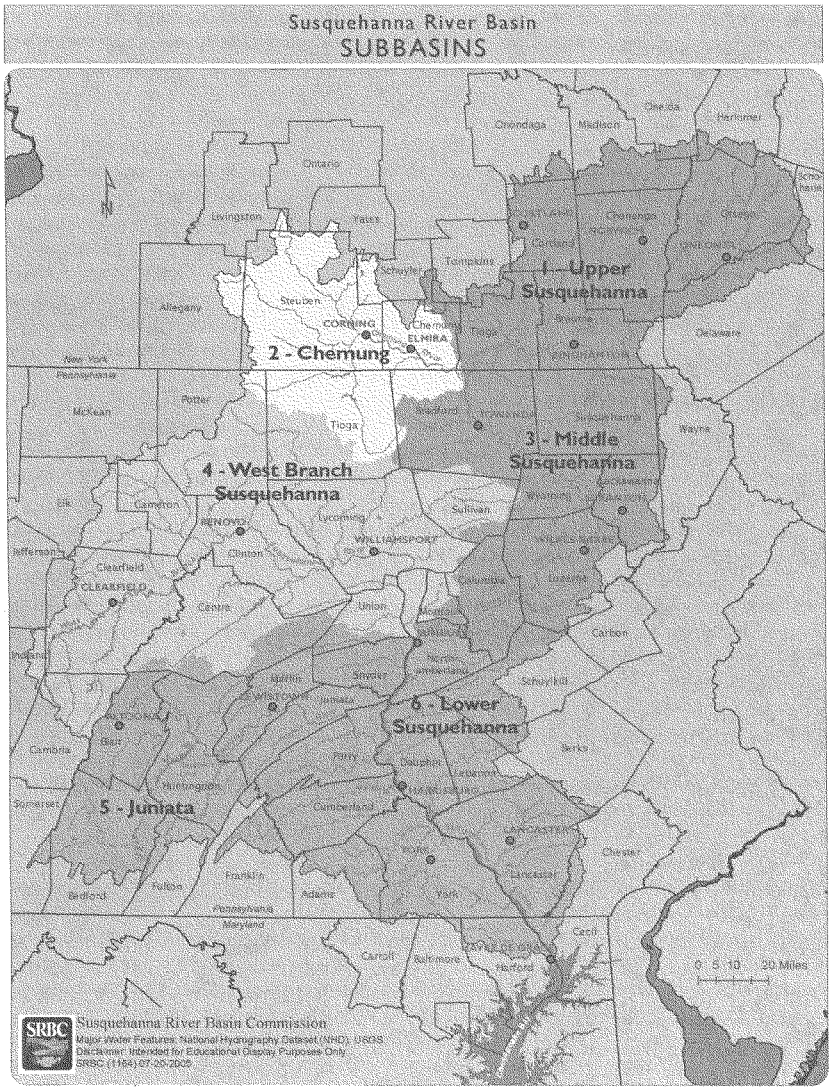
The federal government should have a larger role in water supply. For instance, federal reservoirs can provide much more capability for low flow augmentation to offset downstream water use given appropriate authority and funding. Existing storage should be re-evaluated to determine maximum beneficial use of such facilities for this purpose. Furthermore, with regard to the Corps of Engineers reservoir facilities, the Water Supply Act of 1958 should be clarified to insure that re-allocation of storage for such purposes does not trigger an obligation to recover original costs of construction [see *Town of Smyrna, Tennessee v. United States Army Corps of Engineers*, 517 F. Supp. 2d 1026 (M.D. Tenn. 2007)].

3c. Energy production accounts for the majority of the water withdrawal and consumption in the basin. Flow augmentation is often needed to compensate for consumptive water use.

Potential Solution:

SRBC and federal and state agencies must remain aware of trends and actions for power development at existing and planned facilities and their potential impact on the basin's water resources. All parties must think and plan in terms of watershed, not just project specific, impacts and solutions.

I appreciate the opportunity to provide this testimony. If you have questions or need additional information, I can be contacted at the Susquehanna River Basin Commission, 1721 North Front Street, Harrisburg, Pennsylvania 17102; phone 717-238-0422, Ext. 303; and e-mail, pswartz@srbc.net.


Susquehanna River Basin
SUBBASINS
1 - Upper Susquehanna
2 - Chemung
3 - Middle Susquehanna
4 - West Branch Susquehanna
5 - Juniata
6 - Lower Susquehanna
CORNING
ELMIRA
WILLIAMSPORT
RENOVO
CLEARFIELD
0 5 10 20 Miles
Susquehanna River Basin Commission
Major Water Features: National Hydrography Dataset (NHD), USGS
Disclaimer: Intended for Educational Display Purposes Only
SRBC (1184) 07-20-2005

SRBC INVOLVEMENT WITH FEDERAL AGENCIES

AGENCY	SRBC RELATIONSHIP
Federal Emergency Management Agency	• National Flood Insurance Program
Federal Energy Regulatory Commission	• Licensing & regulation of lower Susquehanna River hydroelectric projects • Migratory fish restoration • Debris management
National Park Service	• Susquehanna Greenway Project
National Weather Service	• Flood Forecast & Warning System • Precipitation, Palmer Index and other climatological information needed for drought and flood operations
Natural Resources Conservation Service	• Water Quality Advisory Committee • BMP implementation • Nonpoint source issues
U.S. Army Corps of Engineers	• U.S. Member • Jt. Administration of Water Supply Storage at Cowanesque & Curwensville Reservoirs • Jt. Effort on Environmental Restoration Project, Whitney Point • Water Quality Advisory Committee • Maintenance & operation of flood control facilities • Section 22 Study, Capital Region Water Board • Wyoming Valley Flood Mitigation Program
U.S. Dept. of the Interior, Office of Surface Mining	• Coordination of AMD issues
U.S. EPA/Chesapeake Bay Program	• Section 106 grant program • Sediment Task Force • Nutrient & Sediment Monitoring • TMDLs • Section 305(b) watershed assessment • Interstate water quality monitoring • Section 319 projects • Source water assessment & protection • BMP implementation • Water Quality Advisory Committee

SRBC INVOLVEMENT WITH FEDERAL AGENCIES
(Cont'd)

AGENCY	SRBC RELATIONSHIP
U.S. Fish & Wildlife Service	• Migratory fish restoration • Protection of fish & wildlife • Environmental restoration project
U.S. Geological Survey	• Stream gages & ground-water level information • Flood forecast & warning • Sediment Task Force • Water Quality Advisory Committee • Sediment Study

STATEMENT OF

THE WATER RESOURCES COALITION

SUBCOMMITTEE ON WATER RESOURCES AND THE ENVIRONMENT

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

HEARING ON

COMPREHENSIVE WATERSHED MANAGEMENT PLANNING

JUNE 24, 2008

Madame Chairwoman and members of the Subcommittee, the Water Resources Coalition is submitting this statement for inclusion in the record of your June 24th hearing on watershed planning and management. The Coalition was established in 2007 to promote the development, implementation and funding of a comprehensive national water resources policy. With member organizations representing state and local governments, conservation, engineering and construction ports, waterways and transportation services, the Coalition works to ensure that a comprehensive , national water resources policy is developed, implemented and funded to provide a sustainable, productive economy; healthy aquatic ecology; and public health and safety.

Because of the breadth of the Coalition's membership, many of our members have extensive experience with various types of federal, State, and local water resources projects ranging from water supply to environmental restoration, to storm damage reduction and navigation. At the federal level, each of us works closely with both the Corps of Engineers and the Bureau of Reclamation.

Watershed planning is not a new concept. In fact, the Corps sought to implement it in the 1960s. One of the obstacles to the success of this more integrated, holistic approach to water resources is the natural inclination of elected officials at all levels to look at

satisfying their own needs. It is more difficult to have a regional perspective until issues such as droughts force governments within a region to look beyond their own borders.

Another obstacle is the need to achieve close working relationships among agencies at the federal and state levels. For example, implementing watershed planning may require the cooperation of the Corps, EPA, Fish & Wildlife, FEMA, Agriculture and other federal agencies, not to mention agencies at the state level. In such a situation, making this partnership work becomes a daunting, but not impossible, task.

In fact, some states have been aggressively managing watershed issues for long enough such that overlaying federal agencies onto ongoing efforts could be counterproductive unless clear jurisdictional boundaries are established. The environmental and water resource benefits desired by state authorities may run counter to the mission objectives of federal authorities, although each merit equal value on a national and regional level.

The lack of a coordinated federal water resources program is another barrier to watershed planning. Each agency pursues its own goals without an over-arching framework of direction and management. This problem is mirrored by the way Congress divides both oversight and funding for these agencies among various committees.

The Corps of Engineers faces another hurdle: It does not recommend water resources policies. Rather, its mission is to study those projects directed by Congress and construct those projects that Congress authorizes and funds. In this lack of a policymaking mission, the Corps differs from other federal agencies that would be involved in watershed planning.

In addition, Congress appropriates funds to the Corps in categories that create "stovepipes" that can discourage integrated approaches to planning. Projects are funded in categories such as Operations & Maintenance, Construction, and Investigations. Within Corps Districts, these categories are often further subdivided into coastal, inland or other subcategories.

Finally, it is one thing to create a watershed program at the federal level and another to fund it adequately. Many of the problems facing the implementation of the Corps' civil works program in recent years would have been avoided or mitigated had Congress provided adequate funding. Instead, maintenance and new construction have been deferred, while Members of Congress do their best to get funding for projects in their own states or districts.

Having raised these issues, the Coalition is strongly supportive of the watershed or regional approach to the planning and management of water resources and related environmental infrastructure. The United States is facing a number of serious challenges. We are in a period of global warming and increased frequency and severity of storms. Our ports and navigation channels are inadequate to meet the needs of domestic and foreign commerce. More and more of our population is moving into riverine and coastal areas of risk, with development also having increasingly negative impacts on the nation's environmental resources.

To meet these challenges, there is a need for an increased level of collaborative planning. The Coalition recognizes that, even in these times of fiscal limits, the financial resources the federal government has to commit to watershed management are significant. However, the states have a major role in watershed planning. The Corps has extensive expertise it can lend to states to assist in this effort. Because watersheds do not stop at State boundaries, the federal government has a responsibility to promote both watershed planning as well as the management of resources and projects within watersheds among States.

At the beginning of this century, a Corps of Engineers study concluded that "much of present watershed planning starts at the local watershed level, where local interests are not clearly linked to regional and national interests." Within the Corps, there is a need for a clear mandate from Congress to create a watershed planning framework that involves not only government agencies and entities but all relevant stakeholders.

Adopting guidance, procedures and training for Corps personnel will be essential to carrying the successful implementation of that mandate.

Some past and present watershed or regional planning efforts have resulted in studies without resultant projects. The Coalition believes that the science of watershed planning needs to be translated more effectively at all levels of government into project level comprehensive planning. In addition, adaptive management should be one of the essential features of watershed projects so that what scientific models have predicted can be measured against actual performance and adjustments can be made to assure that intended goals are reached.

The Coalition also stresses that data is essential to effective water resource planning. In recent years, budget-cutting originating in the Office of Management and Budget has undermined the Corps' data collection programs. There are now chronological and geographical gaps in that data that make watershed planning more difficult. States and private educational and scientific institutions have data that needs to be integrated with federal data and then shared through open computer architecture so that all who need knowledge can have access to it.

In WRDA 2007, Congress enacted a new regional sediment management (RSM) program (Section 2037). RSM is a sister program to the Corps' watershed planning program. The Coalition would like to work with this Subcommittee to make modifications to the RSM language so that it provides the authority to the Corps to take a collaborative regional approach to sediment management.

In WRDA 2007, Congress enacted a new regional sediment management (RSM) program (Section 2037). RSM is a sister program to the Corps' watershed planning program. The Coalition would like to work with this Subcommittee to make modifications to the RSM language so that it provides the authority to the Corps to take a collaborative regional approach to sediment management. Additionally, there were other provisions in WRDA 2007 that addressed watershed management policies and procedures, such as Sections

2010, 2013, 2017, and 2033. This patchwork of policies speaks to the need to establish a single authority within the Corps to ensure a comprehensive, yet streamlined, watershed management effort by federal agencies and non-federal partners. In addition to providing a center of knowledge and management, the authority will suit congressional interests by maximizing federal spending and ultimately reducing the amount of time necessary to resolve regional watershed problems.

The Coalition hopes the Committee will give careful consideration to these recommendations and we would welcome the opportunity to further discuss them with the Committee in the future.

○